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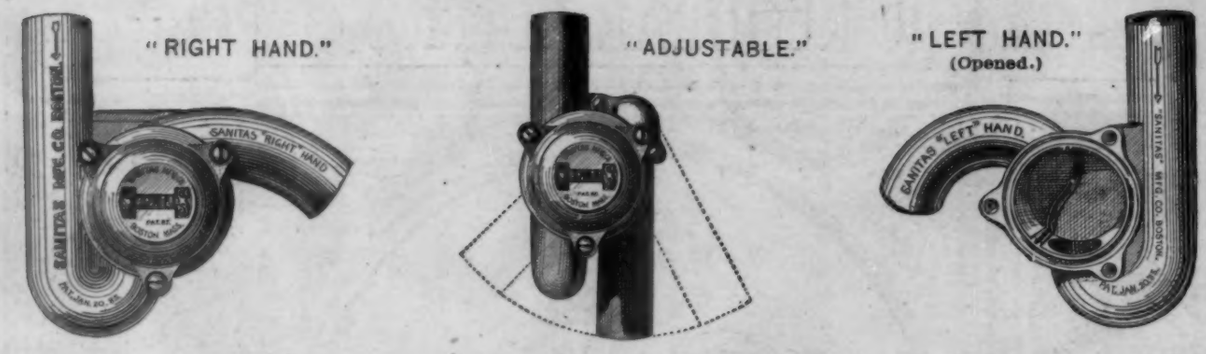

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A VERY damaging admission was made by a witness at the recent session of the Ceiling Investigating Committee at Albany. The witness was one of a firm of dealers in glass, and testified that he sold glass to Snaith, the contractor, for the ceiling, at three dollars a foot, with an arrangement by which a bill was rendered for it at the rate of six dollars a foot, so that it might appear that Snaith actually paid that price for it. In the present case the bill at six dollars seems to have been made out at the request of Snaith, after he got into difficulties, with the hope that it might help him to frame a plausible explanation of what he did with all the money that had been paid him; so that perhaps the glass dealers should be reproached with nothing worse than an over-zealous readiness to concoct fibs to help one of their customers out of a scrape; but the same sort of trick is used in other branches of the building trades to an extent which would surprise outsiders. In altogether too many cases the bills, receipts and vouchers presented to architects as evidence for the settlement of accounts are very far from showing what was actually paid for the goods charged on the bills, and none of the architect's duties require more labor and experience on his part than that of finding out what the true net price of materials used in building is. The habit of keeping up "long" prices, as a means of deceiving the inexperienced or unwary, while the goods are really sold at a fraction of the prices marked on the bills, seem to be chargeable mainly to the wholesale dealers. Of course, they do not use the trick against their own customers, all of whom understand it, but the fact remains that it provides those who buy of them with a means of deceiving those to whom they sell again, and the wholesale dealers seem to think that this inducement will bring them customers. Perhaps it does, but they must be of the poorest kind, while the honorable men, who make out their day-work bills with the real prices, ignoring the list prices altogether, find the lists simply a nuisance. They are really worse than that to them, for there is no question that the suspicion entertained by owners, that they are likely to be robbed in some such way, leads them to put many thousands of dollars' worth of work out to contract which would otherwise be done by the day, with much more satisfaction to them and to the mechanics employed. Nothing is more common in architects' offices than to hear inquiries made about the price of certain materials. Some price is mentioned, or looked up in the lists, and the architect is asked whether it is the net or the list price, and if it is the latter, how much discount there is. As the discounts vary according to circumstances, he can rarely tell what will be the exact net price that his client can get the goods for, and the latter concludes by saying that it will be better to put his work out to contract, so as to secure by competition, not so much the lowest price for the labor, as for the materials employed.

THE proceedings of the Lydecker court-martial seem likely to be of considerable interest, if not importance, to architects. The charge against Major Lydecker is that he failed to do his duty in supervising the construction of the Washington Aqueduct, so that the Government was defrauded out of a large amount of money by the dishonesty of the contractor, and was left with a useless piece of work on its hands. It seems clear that he did not visit the interior of the tunnel very frequently, and the question appears to be whether this circumstance justifies the people concerned in letting the contractor go in peace with his ill-gotten gains, and visiting all the consequence of his rascality on a person of whom the worst that can be said is that he did not discover the tricks that were being practised. This is a question which concerns architects very closely, and, as a contribution to the discussion, the testimony before the court-martial of General Newton, for many years charged with the supervision of the most important Government works, is of importance. General Newton testified that an officer appointed to superintend operations like that of the construction of the aqueduct tunnel "could never prevent fraud by any possible personal inspection which he might make." "Whether Major Lydecker visited the tunnel more or less often did not affect the question at issue, for he could never have visited it often enough to have prevented frauds if the workmen desired to do defective work, and the sub-inspectors were incompetent or unreliable, for all traces of fraud could be covered up." "In the case of the New York Aqueduct," General Newton said, "although there were a number of inspectors, the cheater had got in, and the discovery of the fraud was quite accidental." How different this is from the usual talk on the subject, architects can well appreciate. According to many clients, the principal use of an architect is to enable his employer to put in a "cheater" to build his house, and to hold him responsible for all the cheater's frauds that he does not succeed in preventing, and lawyers are never more eloquent than when they explain that an architect, who "holds himself up as the head of the building profession," is accountable to the owner for all defects in work that he "assumes to supervise."

ARCHITECTS in New York will regret the retirement of Mr. Albert F. d'Oench, who has resigned his post as Chief Inspector of Buildings, to engage in professional practice as an architect. Mr. d'Oench has held his responsible position for about five years, to the satisfaction of the profession and the public. Under him, it is needless to say, there have been none of the scandals which have at times cast discredit on the office, and the criticism of plans, which forms an important part of the New York Inspector's work, has been done with a comprehension of the conditions to be fulfilled which saved much misunderstanding and annoyance. Mr. Brady, his successor, has been long in the Bureau as a subordinate, and is spoken of as a hard-working and capable man.

PHILADELPHIA has just lost a very worthy citizen, in Mr. Walter Allison, who died a few days ago at the age of seventy-three. Mr. Allison was one of the builders of the old school, who have done so much for the credit and prosperity of the communities in which they have spent their active days. He was born in Philadelphia, when Philadelphia was a pleasant, patriotic town, with no thought of railroads or steamboats, and very little of manufactures. His father was a well-to-do carpenter, and the boy was sent to school, and then apprenticed to a book-seller. He soon left this occupation, and took up that of his father, and at the age of twenty-six began business on his own account. From that time until his death he lived in Philadelphia, engaged first in his own affairs, and afterwards, as he became better known, in services to the public. He was for three terms a member of the City Council, and had been a member of the Board of Health, and a director in many other administrative or charitable bodies.

THE Master Builders' Exchange of Philadelphia has decided to establish a complete set of trade schools, in which shall be taught all the principal branches of the art of building. A school of plumbing has been in operation under the same auspices for about five years, with encouraging success, and will be included in the more comprehensive scheme now being carried out. Although the Exchange has taken great interest in the matter, and will undoubtedly do all that it can to insure success, the real originator and supporter of the enterprise is that unwearied friend of the American workingman, Colonel R. T. Auchmuty, of New York, who has offered to contribute three thousand dollars a year toward the expenses of the school for three years, after which it is hoped that it will be self-supporting. Colonel Auchmuty has, it is said, proposed to the Master Builders' Association of Boston to do the same for promoting the establishment of trade schools in that city, and it is altogether likely that his offer will be accepted.

THE Eiffel tower in Paris is very nearly finished, and will certainly be completed by the first of May. The painters have for some time been at work decorating it, and the Parisians naturally take great interest in their labors. With the usual French ingenuity in seizing opportunities for exalting the memory of persons whom they wish to honor, the directors of the work diversified the decoration by having the names of distinguished personages of the last century painted in conspicuous places. This pleased the spectators, until it appeared that some of the most honored names were omitted. The omissions were so glaring that they could not be overlooked, and inquiry was made as to the cause. It then appeared that the names had to be painted in panels of a limited size, none of which would contain a long name, painted in letters large enough to be read from the ground, and the directors were, therefore, obliged to restrict the honors to be bestowed in this way to persons whose names were not more than six or seven letters long. Persons who visit the exhibition should, therefore, remember, as they study the names of the illustrious dead on the great tower, that the list does not comprise all the most distinguished ones, but only those with the shortest names.

THE Paris Exhibition is to be enlivened by four splendid entertainments, which are to be provided at the joint expense of the State, the city of Paris and the Exposition funds, at a cost of six hundred thousand dollars. The first of these is to take place on the fifth of May, the one hundredth anniversary of the meeting of the States-General that became the Constituent Assembly, which is to be celebrated at Versailles with a grand banquet for fifteen hundred guests in the Galerie des Glaces. The second entertainment takes place the next day on the Exhibition grounds, when the buildings are to be opened for the first time to invited guests with ceremonies appropriate to the inauguration of such an affair. The third is on the fourteenth of July, the anniversary of the taking of the Bastile, when all Paris is to be illuminated with a splendor unusual even for the French Fourth-of-July, the Boulevards are to be lighted with strings of lamps, and the Bois de Boulogne and the Forest of Vincennes are to be included in the illuminations. The last affair of the kind is the festival of the inauguration of the monument of the Republic, by Dalou, which is to stand in the Place de la Nation. The date of this is not fixed, except that it is to take place some time in September.

TWO new colors are described in various recent technical journals. The first is apparently a reproduction of a color known to the ancients, and made by them with sand and lime, heated with roasted copper. The pigment, on analysis, appears to be a compound silicate of lime and copper. It is now made with exact proportions of the materials, so that the product is uniform, and the process seems likely to furnish us with a material of great value. The color is a bright, greenish blue, so that it will be more available for decoration than French blue or cobalt blue, both of which are of a purplish cast, and do not mix well with other colors, while it appears to be as permanent as either of them. The other color is a black, which has been made by treating camphor with sulphuric acid. By steeping camphor in strong sulphuric acid a jelly-like mass is formed, of a reddish color. When this is heated it boils, giving off fumes of sulphurous acid, and turns intensely black. By evaporation the unconverted excess of acid and camphor is driven off, and a black mass remains, which seems to have the qualities of Indian ink. Like Indian ink, it can be apparently dissolved in water, and remains suspended for a long time. We hope that some one will pursue the subject of this camphor-black. A pure liquid black is one of the things that science has searched for in vain for many years, and even so near an approach to it as good Indian ink would be a most useful substance.

AN architect in Paris has recently been made to feel the weight of professional responsibility in a rather disagreeable way. Being commissioned to take charge of the erection of a house in one of the new quarters of the city, he made his plans and commenced the construction of the building before the grade-lines of the street had been given by the city engineer. His drawings had been made for a high and spacious carriage entrance in a portion of the front where variations could be made in the grade without inconvenience, but the proprietor, who had a second-hand pair of doors that he wanted to utilize, directed him to make the doorway very small, to fit the dimensions of the doors, and to place the entrance in another part of the front, where changes could be made only with difficulty. The architect followed these directions, instead of protesting against them, as he should have done, and was, moreover, so careless as to allow the door-sills to be set either before the grade-lines had been given, or without properly referring to them. The consequence was that when the house was finished, and the time arrived for laying the sidewalk, it was discovered that the first floor would come below the street, and, moreover, that the sidewalk line would be less than eight feet from the top of the carriage-entrance. Naturally, the proprietor, when he found that he could not drive into his house, refused to pay the architect's bill, and the latter summoned him before the Tribunal of the Seine, which decided that the architect had committed a grave fault, and must suffer the consequences to the amount of two thousand dollars and costs, or a little more than the balance due him on his own bill. It is characteristic of French jurisprudence in such matters that the fact of the architect's having consented to the adoption of a defective position for the carriage entrance, even at the express desire of the owner, so far from excusing his fault, was held rather to have aggravated it.

SAINT AUGUSTINE, Florida, is about to be endowed with remarkable architectural interest by the erection of a Roman, or rather, a Pompeian house, on an immense scale. A small house of the sort was once built by Prince Napoleon in Paris, and King Louis of Bavaria, among his other freaks, constructed one at Aschaffenburg, near Munich, where, under the name of the Pompeianum, it still attracts visitors; but these are small affairs in comparison with the huge house which St. Augustine will possess. Externally, the building is to be quite plain, presenting walls of coquina concrete, colored in the mass, and formed into panels and pilasters. In the middle of the front is a wide door, opening into the vestibulum, and thence into the atrium, a room thirty by forty feet, which forms the reception-room of the mansion. The atrium is open to the sky in the middle, and around it are four cubicula, a bibliotheca and an exedra, or conversation-room; while an ostiarius occupies a small room opening out of the vestibulum, and opens the door to visitors. Beyond the atrium is the peristylium, a room, or rather court, forty feet by fifty-two, open to the sky in the middle, and furnished with a colonnade and a fons. On one side of this court are the pinacotheca and the winter triclinium, both of which are also entered from the atrium, and beyond is the summer triclinium, with which is connected a culina on one side, and on the other a lararium, where the proprietor is to keep what purport to be his household gods. The house stands on a corner, and, according to the Roman custom, one side is occupied by tabernæ, which have no communication with the interior of the house, and are, we suppose, to be rented to the sewing-machine agents and grocerymen of St. Augustine. In the second story, which is reached by a separate entrance from a side-street, are a few rooms and a solarium or roof-garden, which will have fountains, trellises, and other suitable ornaments. The furniture is to be copied from objects in the British Museum and the Louvre, the interior is to be decorated by Parisian and other artists in the purest Pompeian style, and casts of a complete set of statues, such as a Romano-Greek gentlemen of the first century A. D. would be likely to have in his house, will be set up in appropriate positions. The architect is Mr. G. Hornblower, A. R. I. B. A., who, with the consent of the owner, Mr. Franklin W. Smith, of Boston, furnishes the *Builder* with a plan, description, and two fine perspective drawings.

EQUESTRIAN MONUMENTS.[1] — XIII.

AS ADJUNCTS OF ARCHITECTURE.

THE original statue of Louis XII at Blois — the work of Guido Mazzoni, a sculptor of Modena brought from Italy by Charles VIII — bore under it the inscription:

HIC UBI NATUS ERAT DEXTRO LUDOVICUS OLYMPO
SUMPSIT HONORATA REGIA SCEPTRA MANU
FELIX QUAE TANTI FULSIT LUX NUNCIA REGIS
GALLIA NON ALIO PRINCIPE DIGNA FUIT.
Faustus, 1498.

This statue was destroyed in 1793 and was not replaced until in 1845 the government undertook the restoration of the château. The present one is the work of the sculptor Seurre, who based it upon a drawing preserved in the Cabinet des Etampes of the National Library.

A similar statue, probably of Francis I, may have once had a place in the large central opening of the façade of the Château de Gaillon, but the only reason for thinking so is a lithograph by Müller, an artist who was somewhat given to embellishing the subjects he depicted. No mention of such a statue can be found in the printed descriptions of the château, nor any other illustration. Whether or no Müller had any authority for introducing this statue the conception, as shown, is both good and unusual, in that it represents the king boldly riding out from the archway, and not aimlessly ambling along the face of the wall.

Portal of the Chateau de Gaillon.

The photograph of the north porch of St. Maria Maggiore, at Bergamo, is familiar enough, but the amusement excited by the whelp-surrounded lions upon whose backs are placed the pillars of the porch, distract attention from the equestrian statue in the upper part which shows a certain St. Alexander, or, as the figure is often called, Duke Lupus who, also, is shown as riding out from under the canopy. This piece of sculpture is inscribed: "*Filius Ughi di Campilione fecit hoc opus*, 1355." This porch, which was removed to its present position from the Church of San Alessandro in the lower town, gave Street so much pleasure that, in his "*Brick and Marble Architecture*," he speaks of it thus: "Such a porch as this northern porch at Bergamo is, indeed, a great treat to an ecclesiologist, teeming as it does with ideas so fresh and new; and, in a small compass, giving so much of the radical points of difference between northern and southern Gothic, and, at the same time, offering so beautiful a study of constructional coloring, that it is impossible to tire of gazing at it."

So far as research can discover, there is not a single instance of the employment in modern times of an equestrian statue as an adjunct of architecture in the way that was adopted with so much success at Blois. The statue of Louis XII there seems as much a part of the architecture, as integral a part of the architect's original conception, as the open staircase itself. While the embrasure over the entrance remained empty pending the restoration of the château, the observer could not but have felt that the central point of interest of the façade was lacking. Having become habituated to this feature of one of the most elegant pieces of modern architecture, it is doubtful whether a similar employment of equestrian sculpture in connection with another style of architecture would be unquestioningly accepted by the student of art. The figures are sculpturesque, and the action of the horse is gentle enough not to interfere with the architectural quietude of the man.

St. George, Vienna. Fernkorn, Sculptor.

A less successful employment of the Louis XII motive may be found at Nancy — less successful because less architectural in its treatment, and yet not altogether unsuccessful, since the more vivacious action of the horse, which is bestridden by Antoine, Duke of Lorraine, together with the uplifted sword of the rider, bring the composition fairly into harmony with the exuberant flamboyancy of the architectural detail of the central motive of the old Ducal Palace, now converted into the museum of antiquities of Lorraine. Like most of the sculpture now extant on French buildings of an early date, this group, by the sculptor Viard-Jiorné, is but a restoration — though probably not a replica — of an earlier group by Mansuy Gauvain, a sculptor of the early sixteenth century, which had been destroyed by the revolutionary iconoclasts in 1792. The building itself was begun by Duke Raoul, who ruled about 1329, and was finished by René II, while Antoine and Charles III enlarged and embellished it. The central motive, the doorway, was due to Antoine, who finished it in 1512, and it was his figure that was placed there. The building was not restored after the Revolution until 1848, and the present statue was put in place in 1851 where, though all the rest of the building was destroyed by fire in 1871, it still remains.

A less familiar statue of similar character is to be found at the Château de Verger, in Anjou, where Pierre de Rohan rides beneath a projecting canopy. This canopy and the withdrawn curtains held back by little winged genii, stamp this figure as less in place on the outside of a building than the Louis XII and Duke Antoine of Lorraine, and suggest the work of an Italian sculptor, who still retained memories of the treatment of equestrian figures on some of the celebrated mural tombs of Italy.

While at Nancy, since it may not be visited again, it is well to mention another equestrian statute, a miniature figure of Duke René II (1473–1508), the conqueror of Charles the Bold, which is a reproduction of the leaden original by Lépy, which is now in the Museum. This little statue surmounts a fountain which stands in front of the new Church of St. Epore, built, in 1863–75, on the site of an earlier church dating from 1451. The tower and spire here shown are 285 feet high. Besides this little figure which is not exactly in place in this consideration of equestrian sculpture and architecture, there is in the Museum of the Hôtel de Ville a bronze

[1] Continued from No. 683, page 42.

equestrian statue of Duke Charles III, by the sculptor Chaligny, a native of the city; and there is also a statue of the same personage — which may or may not be equestrian — over the doorway of the

Monument to Adam Mickiewicz, Cracow, Poland. Godebski, Sculptor.[1]

Church of Nôtre Dame: it is probably equestrian, however, since it is said to have been taken as a model for the equestrian figure of Louis XIII, at Dijon. More closely connected with this branch of

Doorway of the Convent of St. Francis of Assisi, Palma, Balearic Islands.[2]

the subject, is the equestrian figure of St. George and the dragon which surmounts the Porte St. Georges, at Nancy, a work of the native sculptor, Florent Drouin, which Duke Charles III caused to be erected there.

There is a minor instance of a treatment somewhat similar to the Blois motive to be found at Vienna in the fountain of St. George, which decorates the palace of Prince Montenuovo, now the Anglo-Austrian Bank: here the group, a St. George and the dragon by Fernkorn, gets its framing in a shallow niche in the face of the wall of the first story, but the sculpture can not in any sense be considered as a part of the architecture.

The only bit of modern equestrian sculpture that can reasonably be brought into the same category with these figures was the alto relievo by Mercié over the *guichet* of the Louvre, which has already been illustrated, and which the bas-relief, evidently inspired by it, on the new monument erected at Cracow, to Adam Mickiewicz, by Godebski, sculptor, may serve to recall. The figures on Strasbourg Cathedral seem to be entirely accidental, and not parts proper of the architectural design.

Duke Rene II. Nancy, France.

Wherever else equestrian sculpture is united with the architecture of the building, it is usually in the form of bas-reliefs in such a way as to lie in a sort of neutral ground between decorated construction and constructed decoration, while yet always coming within the province of the architect to control or direct, or else it exists as decoration pure and simple, and the connection of the architect with it has been only to provide the proper pedestals for the detached groups.

It is strange that modern architects should have neglected such a possibility of lending interest to their buildings, although it is not a very obvious means. An equestrian statue with its pedestal is usually in the way in a city, and has either to be set up in a special enclosure of its own stolen from the lawful claim of traffic's needs, or is sent off to find a place in some large park, where few can see it, and where, generally, its sculpturesque and architectural lines are not in keeping with sylvan surroundings. But if such sculpture should be designed for a place on some important building, where it would be out of the way of traffic, and fitly form the central point of some short vista, it could effect a gain in many ways. It could be erected more economically than a statue standing free on a pedestal of its own, for, practically, only two-thirds of the figure need be highly finished, since the parts next the back of the niche could be left in the rough, and what would correspond to the work required for the pedestal could be restricted to that which would be needed to finish but a single side of the same. Or, to put the same idea in another form, for the money needed to erect a good statue standing free, a much more elaborate, more satisfying, and less obstructive result could be achieved by designing the next equestrian statue we have to erect in conjunction with some public or semi-public building about to be erected in a place suitable for the fair exhibition of such sculpture. There are projects now afoot in many cities looking to the erection of equestrian monuments to leaders who fell, on one side or the other, during our civil war, and the Government might do worse things than, after having taken suitable precautions to prevent the supervising architect of the moment turning the matter into a farce, to offer a wall of the next public building to be erected in such city as a background for such a group of statuary. Perhaps the influence

[1] From *La Semaine des Architectes.*
[2] From the *Moniteur des Architectes.*

and advice of an able sculptor who had a stake in the matter might do more to effect a reform in Government architecture than all the expostulations that the public and the architectural profession can formulate.

In spite of the short time since it was in evidence and the great number of photographs of the Louvre that must have been taken while it was still in place, it has not been possible to procure any illustration of the "Gingerbread Man" which caused its unfortunate author, the famous Barye, so much mortification. Here was a case where an unfortunate sculptor — not a then well-known one, to be sure — was wantonly sacrificed to the supposed exigencies of the architectural surroundings. When it was decided to place a bas-relief of Napoleon III over the *guichet* of the Louvre, Barye, to whom the task was assigned, desired to make the figure in high relief, but the architect, probably M. Lefuel, would not listen to his entreaties, but declared that he could not have the delicate lines of his mouldings and surface enrichment interfered with by a treatment so robust as that which the sculptor desired to adopt. As was, of course, strictly proper, the sculptor had to yield, and the figure was modelled in the flattest of relief and reproduced by the galvanoplastic process by Christophle, with such poor success that it was necessary to plug up many holes and imperfections with lead and wax, which gave to the sculpture the mottled appearance which earned for it the nickname "*le bonhomme de pain d'épice.*" But it filled a void, and though laughed at by all, held its place till the fall of the Empire, when it was one of the things that first fell a victim to the iconoclastic rage that, in France, follows political change. Strangely though, it met a kinder fate than some more deserving efforts: thanks to its flatness it was an easy task to conceal it behind a layer of tinted plaster, which served the purpose of the moment and allowed popular rage time to cool, and made it possible at a later day to remove the *plaque* uninjured, and store it away with other displaced royalties and royal belongings in the Governmental bric-à-brac shop, the Garde Meuble.

NORTH PORCH, STA. MARIA MAGGIORE, BERGAMO
AFTER, "BRICK AND MARBLE."

Pierre de Rohan, Marechal de Gie.[1]

In this connection may be mentioned two bits of equestrian sculpture of, to us, unknown originals by unknown authors, which hold positions in respect to architecture similar to one another: supported on a label over the door of the Loggia dei Mercanti — or Exchange — at Ancona, in Italy, stands a little equestrian figure, of animated action, in high relief, while over the doorway of the Convent of St. Francis of Assisi, at Palma, a city on one of the Balearic Isles, is a fragment of a similar equestrian figure.

As one more instance of the many places and ways in which the horse was wrought into ecclesiastical sculpture, may be mentioned the relief of St. Martin, as usual dividing his cloak with a beggarman, on the façade of St. Martin, at Laon, France, the church dating from 1150. The church of St. Croix at Bordeaux, published in the *American Architect*, for December 6, 1884, also contains in a large niche in the façade a group of St. George and the dragon in high relief.

As a type of the horse used as an adjunct, of what may be styled marine sculpture, the famous fountain of Apollo in the Park, at Versailles, may be mentioned.

A very admirable type of the many uses of the horse in connection with pedimental sculpture, or as crowning feature of a triumphal arch, or as support of some piece of heraldic sculpture, may be cited in the group which has a place over the entrance to the Imperial Library, at Vienna, whence it looks down upon the equestrian figure of Joseph II, in the Josefplatz below.

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[1] From La Croix's "*Louis XII et Anne de Bretagne.*"

Charles-Emile-Marie Seurre. — Born at Paris, 1798. Died there 1858. Pupil of Cartellier. Won the prize of Rome in 1824. His works comprise a statue of "Leda"; the statue of Napoleon I, formerly on the Vendôme column; a statue of Charles VII; one of Boileau; and the figure emblematic of poetry on the tomb of his friend Casimir Delavigne, in the cemetery of Perè Lachaise.

Francis I. — Born at Cognac, 1494. Succeeded Louis XII, 1515; conquered the Milanese the same year; was a candidate for the imperial crown, which Charles V obtained, and formed a league with England and the Pope against Francis, who was defeated at Pavia, 1525, and taken prisoner; confined in Madrid until 1526, when he continued the war until 1529, and later until 1544; promoted science, art and literature; died March, 1547.

Chateau de Gaillon. — This magnificent castle, erected at the beginning of the sixteenth century, was built by Cardinal Georges d'Amboise, minister of Louis XII, as a *maison de plaisance* for the archbishops of Rouen, from designs by Androuet du Cerceau, the famous architect. It was enriched with sculptures by Jean Juste of Tours. It was mostly demolished at the Revolution and is now used as a house of detention, having been rebuilt, though greatly altered. A part of the old façade was preserved and has been erected in the courtyard of Ecole des Beaux-Arts in Paris. The fine marble relief of St. George and the Dragon which is now in the Salle de Michel Colombe at the Louvre, was brought from Gaillon. This château was a favorite residence of Francis I.

Pierre de Rohan. — Pierre, Vicomte de Rohan, Marechal de Gié, was born in Brittany about 1450. He was made Marshal in 1475 and enjoyed the favor and confidence of Louis XI and Charles VIII, the latter of whom he accompanied in his Italian expedition. He was appointed by Louis XII preceptor to the young prince, afterwards Francis I, but subsequently fell into disgrace and was deprived of his dignities. Died 1513.

Viard-Jiorne. — Born at Saint-Clément (Meurthe). Pupil of Bonnassieux. The museum at Nancy possesses by him a bust of the chemist Braconnot, and statues of "Christ bound to the column" and "St. Sebastian."

Antoine, Duke of Lorraine. — Born at Bar-le-Duc in 1489. Son of René II. Succeeded his father in 1508. Maintained a neutrality in the war between Charles V and Francis I and reigned mostly in peace. Died in 1544.

Mansuy Gauvain. — A sculptor who flourished at the beginning of the sixteenth century.

Chaligny. — There were two sculptors of this name, David and Antoine, apparently brothers, and this statue is sometimes said to be their joint work.

Florent Drouin. — A sculptor, of Nancy, who lived in the sixteenth century.

Charles III, Duke of Lorraine ("The Great"). — Born at Nancy in 1543. He was the son of Francis I, Duke of Lorraine, who died in 1545. Married Claude, daughter of Henry II of France, in 1559. Died 1608.

Nicolas Lepy. — Born at Nancy, 1785. Died 1869. Pupil of his father. He executed medallions in ivory of the Emperor Alexander and the archduke Charles. In the museum at Nancy is a bust of Leopold I, Duke of Lorraine, in plaster, which Lépy executed in marble for the monument to that prince in the Church of the Cordeliers.

Duke Rene II of Lorraine. — Born in 1451. Became duke in 1473. His dominions being invaded by Charles the Bold of Burgundy, René, with his Swiss allies, defeated Charles at Morat, 1476. The next year he gained another famous victory near Nancy, where Charles was killed in battle. René formed an alliance with Venice and in 1480 was appointed captain-general of that republic; but on the death of Louis XI of France left the service of Venice. He died in 1508.

The Loggia dei Mercanti, Ancona. — This building, was designed by Pellegrino Tibaldi, who lived from 1527 to about 1592.

[To be continued.]

The Strasburg Cathedral. — Since the war the cathedral at Strasburg which suffered considerably from the bombardment of 1870, has undergone extensive repairs. In answer to many suggestions on the subject the building was subjected to a very close examination at the end of last year, the result of which has been extremely alarming. It was proved beyond doubt that many portions were threatened with complete ruin and that no time was to be lost. A report to this effect will be submitted to the municipal council. — *N. Y. Commercial Advertiser.*

SUGAR IN MORTAR.

ALTHOUGH saccharine matter has been employed in India as an ingredient of mortar from time immemorial, and reference has been made to it by standard authorities, which has attracted considerable attention in England and America during the past two or three years, its effect is not generally known.

Sugar unites with lime, and forms sucrate of lime—a solid which possesses considerable strength, dissolves freely in water, and is acted upon by carbonic acid. All hydraulic cements contain at least 50 per cent of lime compounds; hence, if a saccharine substance be added to mortar, the sugar will unite with the lime and form sucrate of lime. The effect of this compound may be an advantage or a disadvantage, according to attendant conditions. For example, if the mortar is composed of common lime and sand, the sucrate of lime, being stronger than the carbonate, will add to the strength of the mortar; and as the lime will unite with the sugar more rapidly than with the carbonic acid of the air, the sugar will also cause the mortar to set more quickly.

In India, the practice is to add one pound of the coarsest sugar (or its equivalent in syrup) to each gallon of water with which the mortar is mixed. "This amount of sugar adds one-half to the breaking strength of the mortar and doubles its cohesive strength." It is better to dissolve the sugar in the water than to mix it dry with the lime, since some limes in slaking "burn" the sugar, thereby destroying its strengthening effect, and also blackening the mortar.

The addition of sugar increases the early strength of lime mortar, since the sucrate of lime develops its strength more rapidly than the carbonate. If lime mortar were used in the interior of thick walls, the addition of a saccharine substance would be beneficial, since lime mortar thus placed would never become fully saturated with carbonic acid.[1] The addition of sugar to cement mortar will accelerate or retard the setting of the cement, depending upon: (1) the amount of sugar present (so far as the cement is concerned the sugar is an adulteration); (2) the relative indurating activity of the sucrate and the silicate, and (3) the amount of water used (the cement is hydraulic, while the sucrate is non-hydraulic, and hence the former will set in the presence of water, while the latter will not). This principle may explain the conflicting results obtained from different experiments. For example, one experimenter[2] found that sugar greatly accelerates the setting of Portland cement, causing it to set in a few minutes; on the other hand, most experimenters[3] find that sugar in any proportions retards the setting of Portland cement. All experimenters agree that sugar retards the setting of Rosendale cement.

Sugar added to mortar may increase or decrease the ultimate strength of the mortar, depending upon: (1) the amount of sugar present, and (2) the relative ultimate strength of the compounds formed. For example, with lime mortar, the maximum effect—an addition of 50 per cent to the ultimate tensile strength—is obtained when the weight of the sugar is equal to about 10 per cent of the weight of the lime. With neat Rosendale cement mortar, the maximum effect at the end of three months—an addition of about 20 per cent to the tensile strength—is obtained with $\frac{1}{8}$ to $\frac{1}{4}$ per cent of sugar. With neat Portland cement mortar the evidence is conflicting. One experimenter[4] obtained a maximum effect—an addition of 25 per cent to the strength—with one per cent of sugar; while another[5] concluded that "sugar was of no great advantage in combination with the best qualities of Portland cement." The last was corroborated by experiments made by the author.

The sucrate of lime, being soluble in the water, will in time be washed out by the rain; therefore the addition of a saccharine substance to mortar is most beneficial in a dry climate, as in India, for example. A saccharine substance should not be added when the cement is to be used under water. The compounds of lime with sugar are attacked by the carbonic acid of the air, and hence the strengthening effect of the sugar is not permanent when the mortar is exposed to the weather. Owing to these two facts, the use of sugar with cement is not of much practical value. Although sugar adds materially to the strength of lime mortar, the compound is inferior in strength and durability to cement mortar, and costs proportionally more.

It is highly probable that the effects obtained by mixing sugar with mortar can also be obtained by the use of gum-arabic, dextrine, glucose, etc. The use of such materials involves some interesting questions; and a study of this subject by a mason-chemist might lead to valuable results.

Ira O. Baker, C. E.

[1] Lime mortar has been taken from the walls of ancient buildings which were only 50 to 80 per cent saturated with carbonic acid after an exposure of nearly 2,000 years.

[2] *Engineering News*, Vol. XVII, page 6.

[3] For example, *Mechanics*, Vol. IX, pages 315-317; a paper read at the Washington meeting of the American Society of M. E., to be published in Vol. IX of the *Transactions* of that Society.

[4] *Mechanics*, Vol. IX, pages 315-317; a paper read at the Washington meeting of the American Society of M. E., to be published in Vol. IX, of the *Transactions* of that Society.

[5] *Engineering News*, Vol. XVI, page 333.

NOTE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

The Josefplatz, Vienna, Austria.

THE ATLANTIC BUILDING, WASHINGTON, D. C. MR. JAMES G. HILL, ARCHITECT, WASHINGTON, D. C.

[Gelatine Print, issued only with the Imperial Edition.]

PLAN OF SECOND STORY.

THE Atlantic Building has a frontage of but 41 feet and a height of 106 feet from sidewalk to top of parapet coping. The lower story supports are of iron. Red Potomac sandstone in second and third stories and brick and terra-cotta, with a few stone bands, above.

CHURCH OF ST. MARTIN, LAON, FRANCE.

This plate is reproduced from Ramée's "*Le Moyen Age Monumentale et Archéologique*" in connection with the article on "Equestrian Monuments."

STATUE OF LOUIS XII ON THE CHATEAU DE BLOIS, FRANCE.

See article on "Equestrian Monuments," elsewhere in this issue.

STATUE OF DUKE ANTOINE OF LORRAINE, AT NANCY.

SEE article on "Equestrian Monuments."

SKETCH FOR THE CHURCH OF THE BLESSED SACRAMENT, PROVIDENCE, R. I. MESSRS. HEINS & LA FARGE, ARCHITECTS, NEW YORK, N. Y.

DESIGNS FOR FIREPLACES BY MESSRS. W. H. ORCHARD AND C. F. BRAGDON: MEMBERS OF THE ROCHESTER SKETCH CLUB.

ARCHITECTURAL SHADES AND SHADOWS.[1]—III.

THE GENERAL METHOD.

Drawing shadows when the line of shade is known, and surface of incidence is a plane parallel to a plane of projection; difficulty in other cases; "slicing" explained; slicing the cone; finding points of its line of shade and of its shadow; shadow of a cone on a cone; recapitulation; note on surfaces of revolution.

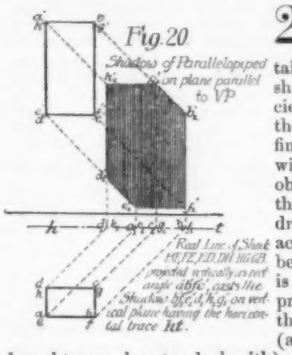


Fig. 20
Shadow of Parallelopiped on plane parallel to V'P
Real Line A Shadow
Shadow b'c', a'b', g'h', on vertical plane having the horizontal trace ht.

29. In order to draw the projections of the shadow of an object, we must ascertain the projections of its line of shade. By drawing through a sufficient number of points of this line the projections of rays of light, and finding the intersections of the latter with the surface of incidence, we obtain the projections of points in the line of shadow which is then drawn through these points with an accuracy depending upon their number. When the surface of incidence is a plane parallel to the plane of projection, and the line of shade is that of a simple geometrical solid (as in a large part of the cases the draughtsman has to deal with), the problem is much simplified. Thus in Figure 20 we have a parallelopipedon whose projections coincide with those of its line of shade (20). Through the extremities of the edges forming this line of shade we draw the projections of rays of light. These intersect the plane of incidence (here supposed parallel to $V'P$) in six points, whose horizontal projections are, of course, on the horizontal trace of the plane of incidence, and their vertical projections directly above, upon the vertical projections of the corresponding rays. The lines connecting these points of shadow thus found form the required shadow of the line of shade, that is, of the object (19 and Maxim X), and the problem is solved.

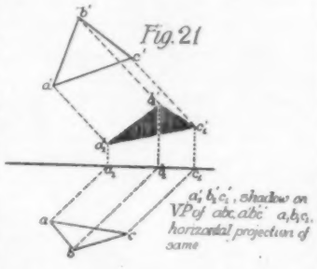
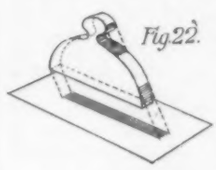
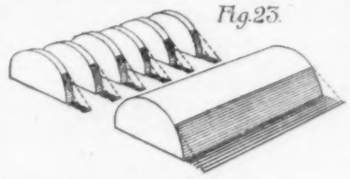


Figure 21 illustrates the application of this process to a plane figure not parallel to either plane of projection, but casting its shadow on one of these planes. Here the line of shade is evidently the "edge" or outline of the figure itself, as shown in 21. In the same way may be found the shadows of a large number of plane figures and of simple geometrical solids when their shadows are cast upon a plane parallel to a plane of projection. Examples of this kind will be shown in Plate II.

30. But when the line of shade is not given, and the surface of incidence is not parallel to HP or $V'P$, or is not a plane at all, the problem requires some more comprehensive method for its solution, and this is furnished by the general method, sometimes called the "Method of Slicing." This is based upon the principle that when a plane figure is parallel to the direction of the light, or, in other words, has one of the elements of its plane parallel to the luminous rays, the figure becomes its own line of shade (21, *b*), its shadow in space a plane, and its cast shadow upon a plane a straight line. The points where rays of light are tangent to its edge, called *points of tangency*, cast shadows which limit its own cast shadow, and of which a part may fall on its own edge, as in *D*, Figure 16, and in Figure 22. Now, by cutting any object and the adjacent surfaces into slices by planes parallel to the rays of light, we obtain a number of such figures. The points of shade and shadow on their edges are points in the lines of shade and of shadow of the object. By drawing the projections of the rays tangent to the outlines of these slices we obtain the projections of points in the required lines of shade and of shadow, which we then draw through these points with an accuracy depending on their number. This operation is illustrated in Figure 23.

31. The slices may be cut by any series of planes parallel to the rays of light, *i. e.*, containing one element parallel to them. But it is convenient to have these slices perpendicular to one of the planes of projection, as they are then projected upon that plane as right lines. If the solid is a geometrical figure, the other projection of





each slice may be found by assuming points upon its rectilinear projection, and finding their positions upon the surface of the figure in the other projection, these being easily deduced from the geometrical properties of the surface in question.

32. Figure 24 shows this process applied to the cone. In *A* the cone is cut by a plane normal to $V'P$, and five points are taken upon the vertical projection of the resulting slice (Chap. II, note 9, *b*). Through these the vertical projections of five elements of the cone

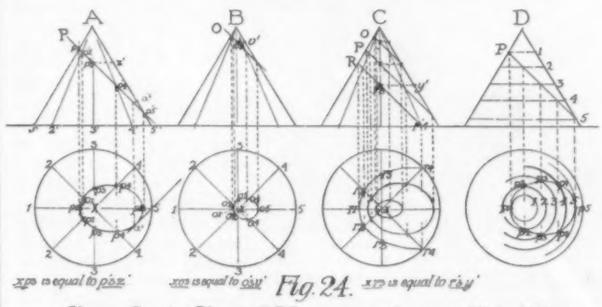
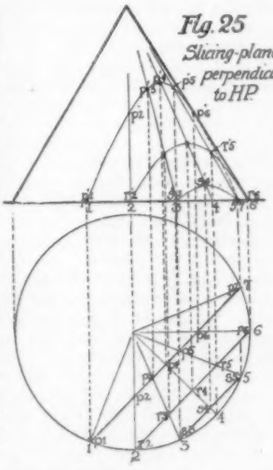


Fig. 24. Slicing a Cone by Planes O.P.R. perpendicular to the Vertical Plane

are first drawn, and then their horizontal projections, upon which the horizontal projections of the five points are easily found, together with three more similarly situated upon the further side of the cone. These eight points determine quite accurately the outline of the "slice" in horizontal projection, and greater accuracy may be secured simply by multiplying the points assumed in the first instance. This outline is, of course, an ellipse, and upon it the horizontal projections of two points of the line of shade may be determined, as above, by means of tangent rays. Their vertical projections are easily found on the vertical projection of the slice.

In *B* the same process is repeated higher up on the cone, and in *C* a section is taken lower down, the other two being repeated. The process may be continued as long as new points in the line of shade are required.

It will be observed that some auxiliary means is necessary for finding the horizontal projections of points on the middle elements, numbered 3 in the figure. This is furnished by the radii $p'3\,z'$, $o'3\,y'$, and $r'3\,y'$, taken at the respective levels of the points situated on these elements, and which show the distance of these points from the axis of the cone. Indeed, the other points might all have been got in horizontal projection by means of radii taken at their various levels, as these points would lie upon the horizontal projections of circles described by these radii (Figure 24, *D*).



In Figure 25 the secant planes are normal to HP; the horizontal projections of the slices are rectilinear, and their vertical projections hyperbolas. Drawing rays tangent to these hyperbolas in vertical projection we may obtain points in the vertical projection of the line of shade, and their horizontal projection can be easily found on the plan below.

32. The form of the cast-shadow of a plane figure or slice parallel to the light, is determined by the intersection of its invisible shadow (which is, of course, a plane coinciding with that of the figure itself, [21, *b*]) by the surface of incidence, and is projected as a straight line when the figure itself is normal to the plane of projection. If the surface of incidence is a geometrical figure or a plane, the other projection of the line of shadow is easily found in the same manner as was that of the line of shade, by consideration of the geometrical properties of the surface in question. Both lines,

[1] By A. D. F. Hamlin, Instructor in Architecture in the School of Mines, Columbia College. Continued from page 127, No. 690.

indeed, are the intersections by one and the same plane of two surfaces, that of the object, and the surface of incidence; and when the secant plane is normal to the plane of projection, the corresponding projections of these two intersections, that is, of the lines of shade and of shadow, lie in the same straight line. Thus, in Figure 26, $p'1\ p'2$, is the shadow cast upon cone b' by one slice of cone a'. By means of a number of such slices we could determine the whole shadow of a' upon b'.

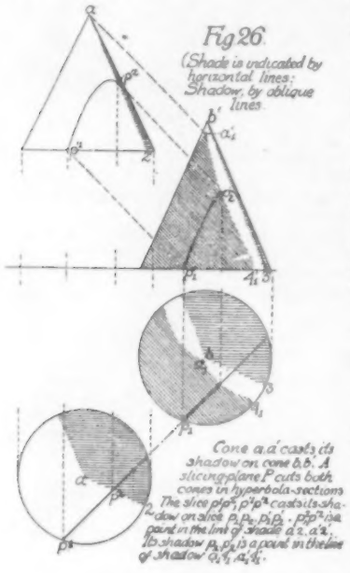


Fig 26.
(Shade is indicated by horizontal lines: Shadow, by oblique lines
Cone a.a' casts its shadow on cone b.b'. A slicing plane P cuts both cones in hyperbola-sections. The slice $p_1p_2^2\ p_1^2p_2$ casts its shadow on slice $p_1p_2\ p_1p_2$. p_2^2 is a point in the line of shade $a2.a'2$; its shadow p_2p_2 is a point in the line of shadow $a_1'a_2'$.

33. This general method may, then, be summed up as consisting of the following operations:

1. Assume any convenient number of secant planes parallel to the light, and normal to one of the planes of projection. The section of the object made by each plane will have one projection coinciding with the trace of that plane, *i. e.*, it will be a right line inclined at 45° to GL (Figure 24, *A*).

2. Assuming points on this right line, their projections on the other plane are found by means of elements of the surface of the solid passing through the given points; the method of drawing these elements in horizontal and vertical projection being determined by a consideration of the geometric properties of the surface. The projection of the slice is then drawn through the points thus found (Figure 24, *A*).

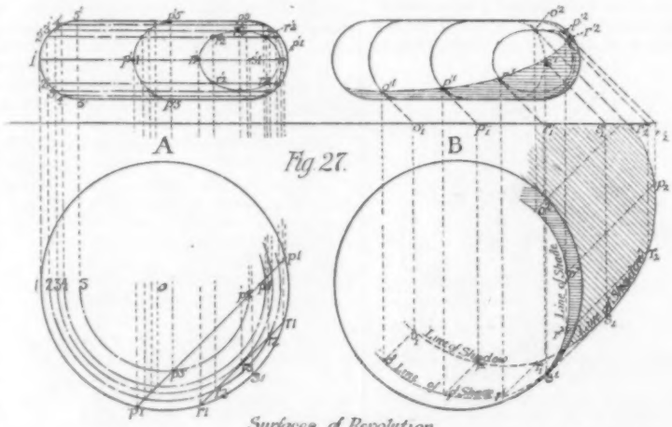
3. To the outline of the slice thus obtained, tangents are drawn parallel to the projection of the direction of light, *i. e.*, at 45° to GL. The points of tangency are the projections on that plane of points of the line of shade. The other projection of each point is found upon the right-line projection of the corresponding slice (Figure 24, *A*, $a^1a'^1$; Figure 26, p^2, p'^2).[1]

These operations are repeated until a sufficient number of points have been found to determine with reasonable accuracy the line of shade. In many cases the known geometrical properties of the surface enable us to determine the whole line of shade by the aid of but one or two of its points. Thus, in the cone, since the line of shade is a right line, having located a single point by means of one secant plane, the line of shade is drawn through that point and the vertex of the cone (Figure 26, $a2$, $a'2$, drawn through $p2$ and $p'2$).

4. By prolonging the secant planes until they intersect the next adjacent surface, and producing the tangent rays until they intersect the outline of the resulting intersection which is ascertainable when the surface is of a geometrical solid or a plane, points of the line of shadow are obtained, and the line of shadow drawn through them. The problem is thus solved (Figure 26).

34. This method may be applied to the case of any object or surface whose geometrical properties enable us to obtain two projections of each slice, one a right line and the other a plane figure; and there are few or no architectural forms which do not fall into this category. It is especially convenient of application to solids of revolution, for which the detailed procedure is explained in the note to this chapter. But there are a great many cases in which this method though applicable, is cumbrous and laborious. For such cases, special processes of more limited scope are handier and more rapid. These short-cut rules generally depend upon an analysis of the properties of particular classes of geometric figures and solids occurring most frequently in architecture, and take the form of a categorical statement of the forms of their lines of shade and of their shadows on planes and other simple geometrical surfaces, with particular instructions for drawing both projections of the forms thus stated. The application of the general method is thus limited to those cases which do not fall under these special rules and conditions.

[1] Hereafter, as in Figures 24 and 26, points of the line of shade will be indicated by letters accompanied by small figures *above* the line; points of shadow by letters with figures "subscript" or *below* the line. Letters followed by small figures on the line indicate points in the slicing-sections.



Surfaces of Revolution.

A illustrates the operation of finding the outlines of sections made by slicing planes P.R. and S. by means of the horizontal circles 1 2 3 4 5, the intersections of these by P R S being indicated by the small figures affixed to p r s. In B are shown tangent rays drawn to fix the section outlines so obtained, giving points of the line of shade (indicated by small figures above the letters) and of the line of shadow (indicated by small figures below the letters).

Note. *Surfaces of Revolution.*—When a surface of revolution has the axis normal to one plane of projection, as HP, for example, it is projected upon that plane as a circle. It is then most convenient to take the slices parallel to the axis and normal to HP. Any point located on the rectilinear projection of the slice (that is, in this case, its horizontal projection) will be in a circle parallel to HP, whose radius is the distance of this point from the axis. The other projection or projections of this circle are easily found (as they are right lines, forming those horizontal elements of the vertical projection of the solid whose lengths equal the diameter of the circle just drawn), and upon them (or it) the required projection of the assumed point is at once determined. This is virtually what was done in Figure 24, *B*, with the points on the element figured 3, and again in Figure 24, *D*. In Figure 27, the points r'^1, r'^2, r'^3, etc., are determined in this way. The symmetry of the figure gives us two points, r'^2, equally distant from the centre *o*, and these give us four points in vertical projection, since it is evident that the circle 2 represents two circles in vertical projection (both marked 2′ in Figure 27). A very few points thus suffice to determine quite accurately the outline of the slice in vertical projection. It is frequently convenient to first assume the circles 1, 2, 3, etc., and allow them to determine the points r^1, r^2, r^3, etc., of intersection with the rectilinear projection of the slice.

Of course, when the axis is perpendicular to $V\,1\,P$, the conditions are reversed as to the projections, and the operation is carried on as above by substituting one set of projections for the other.

The student will find it profitable to practise "slicing" with a number of different solids of revolution—toruses, spheres, ellipsoids, etc.

THE BOSTON MUSEUM OF FINE ARTS.

Boston, Mass., March 25, 1889.

THE Trustees of the Museum of Fine Arts find themselves compelled by the needs of that institution to appeal to the public-spirited citizens of Boston for means to carry it on.

Early in 1887 the growth of the collections made an enlargement of the building necessary. A subscription was asked for, and the sum of $250,400 was given by about one hundred persons for this purpose. It was hoped that a part of this amount could be laid aside as a fund to pay the running expenses, but this was found to be impracticable. More room was needed for Japanese collections of the highest value, which generous friends of the Museum offered to place in it. The proper arrangement of the casts of sculpture, and the convenient circulation of the public on both floors of the Museum, required that the building should be carried round the four sides of a central court. This, with the necessary purchase of casts, will absorb the whole of the subscription.

The income of the Museum applicable to its current expenses was, in 1888, $14,183.30; the current expenses were $23,025.19. These will of necessity be increased by the enlargement of the building.

To administer the Museum to the advantage of the public requires an additional income of not less than $15,000 a year. To provide this sum the Trustees ask for fifteen hundred subscriptions of ten dollars a year. Each subscriber will be entitled to a ticket admitting four persons to the Museum on every day in the year on which it is open.

The Museum of Fine Arts receives no aid from the State or the City; it depends wholly upon voluntary contributions. It has been built and filled with precious works of art which give pleasure and instruction to thousands, solely by the liberal gifts of individuals, not many in number. With the exception of about $5,000 a year received from visitors, its annual expenses have been paid in the same way. It rests its claim for help only on the service it renders to the public; and, in appealing to the public for a wider support, the Trustees feel that they may hope for a general and generous response.

Subscriptions may be sent to E. H. Greenleaf, Curator (to whose

order checks may be made payable), at the Museum of Fine Arts. A ticket will be sent to each subscriber upon the receipt of the sum subscribed.

Samuel A. B. Abbott,	Edward W. Hooper,
Frederick L. Ames,	Henry Lee,
Henry J. Bigelow,	W. P. P. Longfellow,
Stanton Blake,	Charles G. Loring,
Martin Brimmer,	Augustus Lowell,
Francis Brooks,	Charles Eliot Norton,
J. Elliot Cabot,	Edward N. Perkins,
John W. Dickinson,	Henry L. Pierce,
Samuel Eliot,	Alexander H. Rice,
Charles W. Eliot,	M. Denman Ross,
William Endicott, Jr.,	William G. Russell,
John L. Gardner,	Edwin P. Seaver,
William Gray,	Nathaniel Thayer,
William W. Greenough,	George W. Wales,
Thomas N. Hart,	Francis A. Walker,

Trustees.

SOCIETIES

ENGINEERS' CLUB OF PHILADELPHIA. — THE PERMEABILITY OF CEMENTS AND MORTARS.

AT the regular meeting March 16, 1889, Prof. L. M. Haupt presented some notes upon the permeability of cements and mortars, with a view of bringing out a discussion of this subject. He quoted from the recent report of the Board of Experts on the Washington Aqueduct Tunnel. That report says:

"If all of the work could and would be faithfully fulfilled in accordance with the later specifications requiring backing by masonry laid in cement mortar, it would make the tunnel reasonably water-tight; yet it would not prevent all leakage absolutely, and it is difficult to foretell how much water would pass through.

"The head of the water in the tunnel varies from about 75 to 175 feet, and the pressure due to this head from 32 to 76 pounds per square inch. This is an internal pressure, tending to burst the tunnel outward — a direction of force which the tunnel lining is not well adapted to resist; and in an inelastic material like brick or cement cracks are liable to be developed on the least yielding — which would be almost inevitable if any weak points were left in the filling. But even if it were all filled it must be remembered that both brick and cement are permeable to water. It is well-known that bricks are pervious under very ordinary pressure, and experiments have demonstrated that even the best cement is permeable to water and will allow it to percolate under pressure. Mr. James B. Francis, consulting engineer of the proprietors of Locks and Canals in the Merrimac River, Lowell, Mass., made some recent experiments on the percolation of water through cement mortar, a record of which was presented to the American Society of Civil Engineers, May 16, 1888. These experiments showed that about 17¼ gallons of water per square foot of surface passed through a thickness of nearly 16 inches of cement in twenty-four hours under a pressure of 77 pounds per square inch. A thinner block would, of course, leak more rapidly in inverse proportion to the thickness. If the brick and cement of the tunnel were of the same thickness and leaked at the same rate, considering only half the perimeter of the tunnel, it would amount to 5,000,000 of gallons in twenty-four hours.

"Mr. Stauffer's experiments, made in the Dorchester Bay tunnel, serve to throw light on the leakage through brickwork. He constructed a bulkhead of brick, laid in cement, 4 feet thick, in a tunnel 10 by 10 feet. He found that under a pressure of 72 pounds per square inch the water percolated through at the rate of 120,000 gallons per day, or 1,200 gallons per square foot.

"The experience on the Boston Main Drainage Works proved that it was not practicable to build brick masonry that was water-tight under a pressure of 64 pounds per square inch.

"At the new Croton Reservoir, New York, water under 36 feet head was found to percolate through 26 inches of brickwork and 4 feet of concrete.

"The board of experts made some experiments to test the permeability of brick and cement mortar to water under pressure.

"Figure 2, plate 8, shows a sketch of the device used in making the tests. A wrought-iron pipe 5 inches in diameter and about 15 inches long is closed at both ends by caps screwed on. The cap at the bottom has in it a rectangular hole slightly smaller than the end of a brick. A heavy India-rubber gasket, with the same sized opening, is placed at the bottom. In the cap on top of the pipe a smaller pipe enters, which leads from the pump. A pressure-gauge is fixed to this pipe so as to indicate the pressure applied. The brick or block of cement to be tested is set upright inside the cylinder, with its end down, the upper cap being removed for that purpose. A good potter's clay is then pressed into the open space around the brick until the clay comes up to the brick. The cap is then placed on and the pump applied.

"A good, fair specimen of brick was selected from a pile at the Champlain Avenue shaft, and under a pressure of water amounting to 80 pounds per square inch for one hour passed 23.4 cubic inches of water. The same brick under trial for a second hour passed 21.3 cubic inches of water. Taking the average of these two experiments, and reducing to the amount of water passed per square inch of exposed area of surface of the brick, it was found to be 2.8 cubic inches. This is equivalent to 1.75 gallons per square foot of surface per hour; or for the whole interior surface of the tunnel, 27,342,000 gallons per day of twenty-four hours.

"For another selected brick, in the first hour under 80 pounds pressure, 46.8 cubic inches of water passed through; and for the same brick in sixteen hours, under only 53.8 pounds pressure per square inch, 344.5 cubic inches passed — equivalent to 1.68 gallons per square foot of surface per hour; or for the interior surface of the tunnel, 26,248,320 gallons per day.

"Blocks of cement mortar were prepared, in the proportion of cement one part and sand two parts — the materials having been obtained from the stock on hand at Champlain Avenue shaft (the same as used in the tunnel). These blocks were allowed to set for twenty-four hours in the air, and were then placed in water, where they remained for five weeks.

"One of these blocks, placed in the testing apparatus, and subjected to a water-pressure of 80 pounds per square inch, passed in a time of two and one-half hours 2,367.8 cubic inches of water — equivalent to 73.8 gallons per square foot of surface per hour — very far beyond the amount of percolation given by brick.

"A second experiment, under 58 pounds pressure per square inch for one and a half hours, gave a percolation of 874.8 cubic inches of water — equivalent to 45.5 gallons per hour per square foot of surface.

"It is to be noticed from the experiments of Mr. Francis that Portland cement mortar having the same proportions of material as in this case did not transmit the water nearly so rapidly. This was owing in a great degree to the cement; but probably partially to the difference in the quality of the sand, as the sand here used was not of the very first quality. The cement bricks presented an appearance of great porosity; and the result was not altogether unexpected.

"It is to be regretted that the time at the disposal of the Board would not allow extensive and conclusive experiments on this subject."

There was some discussion by Mr. Arthur Marichal and others. Mr. Marichal said that the imperviousness of cements is a question of the greatest importance; yet it seems that no steps are taken by manufacturers to improve their products in that direction. The *fineness* is one of the most important considerations, and wherever percolation is prejudicial — as is the case in aqueducts subjected to pressure, in dams, and in works exposed to sea water — care should be taken to select a very finely ground cement. The manipulation of the mortar will also affect its imperviousness.

When asked whether it was possible to make cellars water-tight by means of cement, if the level of the water was, for instance, generally a couple of feet above the floor, Mr. Marichal answered that some years ago he succeeded in rendering perfectly water-tight, by means of cement, some cellars which used to contain about six feet of water. He then described the process of construction, some discussion of which followed, by Mr. Howard Murphy and others.

Howard Murphy, *Secretary and Treasurer.*

THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.

Paper of the evening by Jno. A. Brashear on "Optical Glass." An interesting description of the casting and grinding of the glass, method of purification and annealing, and examination for internal strains of both flint and crown glass. The imperfections of the glass were described as being due to improper annealing, leaving internal strains, which can be detected by polarized light; also to striæ or chords, which are shown by lines running through the glass, which are liable to be formed in both crown and flint glass. These are shown by examining with a lens, which gives a diffused light, and shows them up well in looking toward a bright light beyond. Striæ are caused by non-homogeneity in the glass, from unequal density of the mass, and from mixture of alumina arising principally from the clay of the pots in which the glass is melted. Striæ causes abberations, which are cured, when they exist in *small* areas, by rubbing the surface down at the location where the stria exists, in that way changing the direction of the light so much as to throw it entirely away from the focal plane of the lens system, thus making it harmless. An interesting description was given of the method of cutting out the lenses from a block of glass with emery. This is done in fifteen minutes' time.

The speaker claimed that optical glass could be made in Pittsburgh, and ought to be, that it needed only the skill and patience of trained operators such as have had long experience in France.

BUILDING LAW

PAYMENT FOR UNEXECUTED PLANS.

Question.— Can you refer me to any adjudicated cases touching upon an architect's right to be paid for plans and specifications for buildings

not carried out. I have found it necessary to sue for pay for such services and beg you to send me references at once.

Very truly yours, Vitruvius.

In further reply to this question which was answered in the *American Architect* for March 30, 1889, we may refer to a recent New York case, Romeyn *vs.* Sickles, 15 *North Eastern Reporter*, 698, in which an architect who undertook to draw plans for an apartment-house tried to hold the defendant personally liable, though he was only the promoter of a proposed club for the erection of the building, and the understanding between the parties had been that the architect's payment was conditional on the formation of the club or the building of the house by the defendant personally. The club was not formed and the defendant abandoned the scheme entirely. On these facts the Court of Appeals decided that the defendant was not liable for the plans. The following extract from the opinion shows the business-like view of such transactions that is taken by the courts of law, and the strong presumption of fact that in these cases the employer does not make himself liable except in the event of the building being commenced.

"We do not think that the evidence warranted the finding of the referee that the defendant agreed with the plaintiff to erect a building either by himself or through a club. . . . The inquiry in such cases always is what the parties would probably have agreed upon if the contingency had been within their contemplation at the time of making their contract. Suppose the plaintiff had said to the defendant: I am willing to rely upon your judgment and taste in the adoption or rejection of my plans, and to give you credit for their payment if adopted; but your plans are all in embryo, and I do not know whether you will finally build or not; I therefore insist upon your agreeing absolutely to build. Can the court say that the defendant would have entered into such an engagement? We think not. . . . Certainly nothing could have been further from the contemplation of the defendant than that he should be required to pay for plans which would prove useless to him, or that he should be compelled to proceed with the erection of a structure which he had never finally concluded to build, and it is not reasonable to suppose that the plaintiff believed that the defendant absolutely contracted with him to carry out plans which he knew were then immature and unformed. . . . An absolute contract to build was foreign to the object and design of negotiations with the architects, and was entirely unnecessary to the purpose which they all had in view. . . . It cannot be assumed that the employer intended, under such circumstances, to pay for the plans, unless they were of value to him, and were used in the construction of a building; and this view is strengthened by the further provision of the contract that in case they were adopted, such architect was thereby employed to superintend the erection of the building. The contract assumes the necessity of the erection of a building following the adoption of a plan as the consummation of the act of acceptance. That the defendant preferred the plaintiff's plans over those presented to him, falls short of what is required to constitute an adoption of plans for the erection of a building. This requires a determination to build as well as an inspection of plans for building. It constitutes something more than a mere mental emotion, and, in order to perfect it, demands a resolution to use those plans in the prosecution of work already determined upon."

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE STORY OF A STATE-HOUSE.

To the Editors of the American Architect:—

Dear Sirs,—It has recently been announced that the work of carrying out the enlargement of the Maine State Capitol at Augusta, has been awarded to Messrs. Brigham & Spofford, architects, of Boston, and the story of this whole recent agitation as to the location of the State Capitol building may be of some interest to architects generally.

There had developed throughout a large section of Maine a desire to have Portland made the Capital in place of Augusta. This desire the people of Portland had, naturally enough, been active in encouraging. The city is the one most accessible from the State at large, it being the railroad centre as it is unquestionably — to use a much abused expression — "the intellectual centre" of the State. The beauties of its surrounding scenery are great. All these considerations the citizens of Portland actively urged as reasons for locating a capitol building at Portland, the time having come when the accommodations afforded by the capitol at Augusta were entirely inadequate to the needs of the legislature.

The question being agitated of making alterations to the present capitol building, it was felt that now was the time for Portland to make her bid for the honor of being designated the Capital of Maine. Her citizens offered to the State the free gift of an ample lot of land on the famous Western Promenade, supplemented by a sum of $150,000 toward erecting on this lot a new state-house. This offer being declared, there was appointed by the legislature a committee of ten, to visit Portland and inspect the city. In anticipation of the arrival of this committee, plans for a capitol building were prepared by two firms of Portland architects. These designs were made on a basis of cost not to exceed $600,000, exclusive of furnishings. One of them, specially adapted to the lot on the Western Promenade, could have been built within the sum mentioned, while the other would not have exceeded it by more than $200,000 at the most. The committee having inspected the city and the designs presented by the Portland men, returned to Augusta determined to advocate strenuously the building of a new capitol at Portland, rather than the enlargement of the old capitol at Augusta. A day was set for a public hearing at the State-house, on the subject of transferring the Capital. On the day of this hearing, Portland people were present in Augusta in large numbers, urging in all honorable ways the claims of their city. Among their implements of persuasion were the two designs showing what manner of state-house would be recommended by Portland architects. The efforts of the Portland people on this day, coupled with the efforts of the committee of ten advocating removal, so impressed the members of the legislature, that a canvass, made a few days later, showed a majority in both houses in favor of locating a new state-house at Portland.

One day having proved insufficient for the hearing on this important subject now agitating all sections of the State, the hearing was adjourned to a date some days later; and it was at this meeting that the junior member of the firm of Brigham & Spofford, architects, rendered his first efficient service to the then minority party in the legislature opposed to removal. He was introduced by them as one of the architects of the extensive additions to the State Capitol at Boston — work already under way.

Having been thus introduced, Mr. Spofford proceeded to put the people of Maine on guard against the devices of their own architects, by declaring with the air of one having authority, that the designs submitted by Portland men, and there to be seen, would cost each a sum almost double that reported by their authors. Though his specific criticism was directed against the more costly of the two designs, he said nothing to prevent the public involving the other with his criticisms against the first. With the service thus rendered, the tide of sentiment in the legislature was in a few days turned against the claims of Portland, with her architects who were scheming to involve the State in reckless expenditure. When the question of removal was put to the vote, it was readily voted down; while an appropriation of $150,000 to repair and enlarge the present State Capitol was as readily voted in.

It is not surprising that the members opposed to the plan of removal should desire that some architectural authority be found to place at a very high figure the cost of executing the designs submitted by architects of Portland. It is not surprising that when this authority had been found, and had passed an opinion based upon the wishes of the opposition, rather than upon any fair and intelligent survey of the designs themselves — it is not surprising that, when this had been accomplished, the hearts of the opposition members should have gone out to the gentleman whose opinion had been of so much service to them.

On the day before the award of this work upon the Maine State Capitol to Messrs. Brigham & Spofford, several of the architects of Maine presented themselves before the Building Commissioners at Augusta. This was done in response to the following notice:

"The Commissioners on enlargement of the State Capitol will give a hearing at the State-house on Wednesday, April 3, 1889, to receive any plans or suggestions as to enlargement which may be offered. Architects and all others interested are invited to appear. For further information, address Secretary of the Commission on Enlargement of the State Capitol, Augusta."

A note sent by a firm of Portland architects, requesting certain further information, was answered by a written letter giving sizes of rooms required, etc. This was received four days previous to the hearing.

At this hearing, the treatment of the Maine architects by the Commission, of which Governor Burleigh is Chairman, was most courteous. It was also as just as could be expected of gentlemen not versed in the ethics of architectural competition.

The Commissioners were ready to allow the Maine architects to present plans in competition, but under such conditions of ridiculously short time and of awards as to constitute terms even less just than those offered in the competition for enlargement of the Massachusetts Capitol. The protest of the architectural profession against the terms of the Massachusetts competition, and the general refusal to engage in it, are events too fresh in memory to require more than passing notice here.

John Calvin Stevens, of Portland, acting as spokesman for the architects of Maine, declared to the Commissioners that it would be impossible to accept the terms offered, since at least two of the architects present had signed a published remonstrance against similar terms lately offered in Massachusetts, and had thereby bound themselves to have nothing to do with architectural competitions

conducted on such a basis. He then presented to the Commissioners terms under which architects might compete with dignity and with justice to themselves. These terms were as follows:

The Commissioners shall institute a competition with the following terms:

All drawings to be submitted under motto or device, in no case the names of authors to be shown upon the drawings, but to be enclosed in a sealed envelope marked with motto or device shown on plans.

A disinterested architect to be selected to assist the Commission in considering plans submitted, and award position in regard to merit.

Prizes to be given as follows:

First Prize — Carrying out the work at the usual rate of commission.
Second Prize — $ } Such sums as the Commission may
Third Prize — $ } decide.

Time for submitting plans shall not be earlier than May 4, 1889.

The architects of Maine did not ask any advantage for themselves. They asked merely that the work be thrown open to the competition of all architects in the country. In this competition the Maine architects were willing to take their chances.

As final result of the conference between the Commission and the architects, there was issued, two days later, this circular:

Augusta, Me., April 3, 1889.

Dear Sir,— At a late meeting of the Commission on Enlargement of the State-House last evening, it was voted:

That the terms relative to a competitive trial for plans proposed by architects who appeared before this Commission to-day do not meet the approval of this Commission.

It was further voted:

That the Secretary be instructed to forward a copy of the above vote to each of the aforementioned architects.

Respectfully yours, C. S. Hichborn, Secretary.

The Commissioners then awarded to Messrs. Brigham & Spofford, of Boston, without competition, the place of architects for the enlargement of the State Capitol at Augusta.

Albert Winslow Cobb.

THE EFFLORESCENCE ON BRICKWORK.

Boston, Mass., April 8, 1889.

To the Editors of the American Architect: —

Dear Sirs, — The writer has made some investigations of the "white efflorescence" on brickwork which may be of value to your readers, especially if they will aid him by sending samples obtained from their experience.

Four samples were examined, all from Brookline, and within a narrow space, a few rods in fact, of each other.

Two of these consisted mainly of carbonate of soda. These were from houses built at different times, one some four years ago, and the other more recently.

One, from the house of Mr. R. S. Peabody, architect, was chiefly sulphate of magnesia, and one was chiefly carbonate of lime.

The probability is, that the carbonate of soda is caused by the action of the lime of the mortar acting upon a silicate of soda in the brick, forming caustic soda, which, when it comes to the surface, is carbonated by the carbonic acid always contained in the air.

The presence of silicate of soda in a brick is often caused by the use of a *salt* clay, taken near the sea.

Sulphate of magnesia is generally due to the presence of pyrites in the clay, which, when the bricks are burned, changes to a sulphate, forming with the magnesia of the lime, a sulphate of magnesia.

The carbonate-of-lime sample was upon a very new house, and was merely the leaching of lime from the mortar, carbonated by the atmosphere.

These results all point to the fact that in all cases, so far examined, efflorescence is a combined result of the mortar *and* the brick.

The writer would suggest that it would be likely to lead to interesting facts if the architects would send him samples of efflorescences that they may observe.

Send a quarter ounce or more, if possible, and when practicable a piece of the brick used.

A perfectly impervious oily varnish will prevent these salts exuding from the surface, but linseed oil is not suitable alone.

Any samples to the undersigned will be carefully examined, *gratis*, and may lead to more light on this very interesting subject.

Samuel Cabot.

70 Kilby Street.

HAS THE STATE CAPITOL AT ALBANY SETTLED?

San Francisco, Cal., March 21, 1889.

To the Editors of the American Architect: —

Dear Sirs, — At various times during the past few years, and since the completion of the State Capitol Building at Albany, N. Y., newspaper paragraphs have hinted at a settlement or cracking of that structure.

Is this true, and if so to what extent? In view of the fact that skilled engineering talent was employed in designing the foundations, and the methods adopted have been published, it would be of value to future constructors to know whether the work was a perfect success or not.

"Foundation."

[A story is occasionally circulated, apparently by newspaper reporters who find time hang heavy on their hands, that the Albany Capitol shows signs of sliding down the hill into the Hudson River. At times the matter has attracted attention enough to call for an investigation, but we believe that no indication whatever has yet been discovered that the ground under the building had yielded, nor has any sign appeared of a failure of the foundations, so far as we know, except under one or more of the piers supporting the vault over the Assembly Chamber, where a settlement is said to have been observed, which was attributed to the fact that a load which it was not calculated to support was brought upon it by the construction, or possibly by the movement, of the vault. — Eds. American Architect.]

HOW TO MAKE A CELLAR WATER-TIGHT.

Salem, Mass., April 2, 1889.

To the Editors of the American Architect:

Dear Sirs, — I am making plans for a heavy brick building to be erected on "made" land near the sea. A cellar is to be made under part of it, the finished bottom of which is 2′ 6″ below high water-mark. Will you please tell me how this cellar can be made tight?

Yours truly, "Seawater."

[The common way of making such cellars tight is to drive sheet-piling around the outside, of three or four inch planks, tongued and grooved, or grooved and splined, set about eighteen inches from the outside of the cellar walls, and to fill in the space between the walls and the piling, to a depth somewhat below the cellar bottom, with a tough blue clay, or "boxing-clay," well-kneaded to make it homogeneous — this keeps the water out tolerably well, until the piles rot; and the bottom of the cellar is covered with concrete, to keep down the water which would otherwise force its way up from the subsoil. According to our experience, however, this cannot be depended upon to keep all moisture out of the cellar. Some will "weep" through the walls, when there is a pressure outside, and where the hydrostatic pressure is considerable, drops will force their way up through several inches of ordinary concrete. For these reasons, it is usual to provide "boxed" cellars with an outlet-pipe and a check-valve, arranged so that any water that may collect will run out at low tide, but will be prevented by the check-valve from coming back again. A more effectual, but expensive method is to line the cellar walls and floor with several layers of asphalted felt, mopped with melted asphalt. As the pressure of the tide would force this in, it must be held in place by lining the walls with brickwork or concrete, a foot thick or more, as high as the water is ever likely to rise outside, and by covering the floor also with thick concrete, or laying the bottom with an inverted arch of brick, and then levelling up with concrete. There are two or three contractors in New York who will undertake the latter process, and will guarantee its success. The clay-boxing is done by contractors in almost all seaboard cities. — Eds. American Architect.]

NOTES AND CLIPPINGS

Statistics That Have Interest. — A German statistician says: There are at present 3,064 languages spoken by the inhabitants of our globe, whose religious convictions are divided between 1,000 different confessions of faith. The number of males is nearly equal to that of the females. The average duration of life is 33 years. One-fourth of the population of the earth dies before attaining the seventeenth year. Of 1,000 persons only one reaches the age of 100 years, and not more than six that of 65 years. The entire population of the globe is upward of 1,200,000,000, of whom 35,214,000 die every year; 96,480 every day; 4,020 every hour; 67 every minute, and 1 and a fraction every second; on the other hand the births amount to 36,792,000 every year; 100,800 every day; 4,200 every hour; 70 every minute; 1 and a fraction every second. Married people live longer than the unmarried, the temperate and industrious longer than the gluttons and idle, and civilized nations longer than the uncivilized. Tall persons enjoy a greater longevity than small ones. Women have a more favorable chance of life before reaching their fiftieth year than men, but a less favorable one after that period. The proportion of married persons to single ones is as 75 to 1,000. Persons born in Spring have a more robust constitution than those born at other seasons. Births and deaths occur more frequently at night than in the day time. It may finally be added that only one-fourth of the male inhabitants of the globe grow up to carry arms or perform military service. — *Paris American Register.*

Earthquake-proof Houses. — As foundations for a building, there are two types: In one, which is the European method of building, the structure is firmly attached to the ground by beds of concrete, brick and stone. In the other, which is illustrated in the Japanese system of building, the structure rests loosely on the upper surface of stones or boulders. As an indication of the relative value of these two forms of building, it may be mentioned that in Yokohama, in 1880, many of the European buildings were more or less shattered, whilst in the Japanese portion of the town there was no evidence of disturbance. The houses, like the foundations, are also of two types. In the European house built to withstand earthquakes, of which there are examples in Tokio and San Francisco, and for which in America patents have been granted, we have a building of brick and cement bound together with hoop-iron and numerous tie-rods. A building like this, which from time to time is jerked backwards and forwards by the moving earth, to which it is secured by the firmest of foundations, is expected to resist the suddenly applied and varying stresses to which it is exposed by the strength of its parts. This type of structure may be compared to a steel box, and, if its construction involves any principle, we should call it that of strength opposing strength. Some of the buildings in Caracas, which are low, slightly pyramidal, have flat roofs, and which are bound along their faces with iron, belong to this order. These so-called earthquake-proof buildings, with the exception of their chimneys, have certainly satisfactorily withstood small earthquakes in Japan. As to how they would withstand a disturbance like that at Cassamicciola is yet problematical. Unfortunately, these structures are very

expensive. The second type of building may be compared to a wicker-basket. This is certainly as difficult to shake asunder as the steel-box type, and at the same time is not so expensive. The Japanese house belongs to this type. It is largely used on the west coast of South America, and in Manila, since the disaster of 1880, it has rapidly been replacing the heavy stone form of structure. Briefly, it is a frame house with a light roof of shingle, felt, or iron. As put up in Japan, its stability chiefly appears to depend on the fact that it is not firmly attached to the earth on which it rests, and that its numerous joints admit of considerable yielding. The consequence is that, whilst the ground is rapidly moving backwards and forwards, the main portions of the building, by their inertia and the viscous yielding of their joints, remain comparatively at rest. A house that my experience suggests as being aseismic, and at the same time cheap, would be a low frame building, with iron roof and chimneys supported by a number of slightly concave surfaces resting on segments of stone or metal spheres, these latter being in connection with the ground. Earthquake-lamps, which are extinguished on being overturned, would lessen the risk of fire, while strong tables and bedsteads would form a refuge in case of sudden disturbances. In earthquake towns the streets ought to be wide, and open spaces should be left, so that the inhabitants might readily find a refuge from falling buildings. Brick chimneys running through a wooden building, unless they have considerable play, and are free from various portions of the building, are exceedingly dangerous. In consequence of the vibrational period of the house not coinciding with that of the chimney, the former, by its sudden contact with the latter when in an opposite plane of motion, almost invariably causes an overthrow. In 1880, nearly every chimney in the foreign settlement in Yokohama was overthrown in this manner, and the first alarm inside the houses was created by a shower of bricks falling on beds and tables. Since this occurrence, the chimneys in Yokohama have had more or less play given to them where they pass through the roofs. Chimneys with heavy tops, like heavy roofs, must be avoided. Another point requiring attention is the pitch of a roof. If this is too great, tiles or slates will be readily shot off. Archways over openings should curve into their abutments; otherwise, if they meet them at an angle, fractures are likely to be produced. If, for architectural reasons, or as a precaution against fire, it is necessary to have buildings which are substantial, their upper portions ought to be as light as is consistent with their requisite strength. Hollow bricks, light tiles, with papier-maché for internal decorations, have been recommended as materials suitable for superstructures. At the present time, the city of Manila, partly through Government interference, and partly through the desire of the inhabitants to reduce the chances of further disasters, presents a singular appearance of light superstructures rising from old foundations. Iron roofs are visible in all directions, whilst on the massive basements of old cathedrals and churches upper stories of wood, with cupolas and spires of corrugated-iron, have been erected. — *J. Milne.*

The Arch of Aurelius at Tripoli. — It is characteristic of Tripoli that the most remarkable monument in the whole town — one might almost say in the entire province — should be so hidden away amid a litter of squalid and unsightly hovels that a careless observer might easily let it pass unnoticed. Indeed, more than one student of Mr. Murray's red-bound Koran has left Tripoli under the impression that the "Arch of Aurelius" exists no longer, having doubtless expected to see something like the Arc de Triomphe at Paris or the Brandenburger Thor at Berlin or the "Gate of Tiberius" at Ancona. But the wonder is actually there for all that. Picking your way along one of the narrower streets that lead up from the harbor, you are struck with an indefinable something in the aspect of a shapeless block of masonry on your right, which impresses you sufficiently to make you halt and take another and a closer look at it. This second glance reveals to you, in the midst of the rough stones and rubble with which Turkish barbarism has filled-in and blurred its magnificent outline, the grand sweep of a noble classic arch, which, with its massive blocks and its smooth, symmetrical masonry, asserts itself unmistakably through all the unsightly chaos around it. And there on its side, distinct in every line as when it came from the carver's hand 1,725 years ago, the car of Roman conquest, whirled along by the mythical she-wolf with which Rome's history commences, is seen rushing like a hurricane over the necks of prostrate nations. A crafty-looking old Tripolitan gentleman in a greasy blue robe and soiled white turban, with a face like a badly-made piece of chocolate, comes slouching up as soon as he notices that you are examining the monument, and gives you to understand (in a queer jargon of mingled Italian and Arabic, eked out by profuse gesticulation) that there is still something more to be seen. And so indeed there is, for the old fellow promptly unlocks a low plank door, and in another moment you find yourself standing right underneath the famous arch, and looking up at it from the inside. It is naturally somewhat of a shock to you to discover that the interior of this splendid monument of the Classic age, erected in honor of one of the greatest rulers of ancient Rome, is now used as a storehouse for casks of flour and potatoes. But all thought of this profanation is quickly lost in the contemplation of the grand old relic itself. Seventeen centuries of storm and battle have failed to dislodge one block from its walls or to shake down one stone of its roof. When it first rose above the Mauritanian palm trees Christian martyrs were being thrown to the lions in the newly-built Colosseum at Rome and painted savages were hunting wolves over the future site of London. Since that time the Roman Empire has vanished from the earth and the savage "Britanni," who were Virgil's chosen type of the lowest barbarism rule thrice as many lands as the proudest Cæsars, while a new world of which the boldest classic navigator never dreamed has arisen to spread its renown over the whole. But although the very site of Aurelius's palace is now unknown and Aurelius himself is but a dim historical phantom, this strange old monument of his greatness still stands here like a tombstone of Rome's departed glory, the same yesterday, to-day, and forever. — *David Ker in the New York Times.*

Cremation in Paris. — Everything is being done in Paris to induce people to have their dead bodies burned. A new crematory has just been constructed, according to the plans of M. Geuilard, a municipal counsellor. This furnace is entirely of brick, and its partition-walls have in their entire length a series of holes which give passage to large metallic tubes through which gas is let in by force, having been pumped into the furnace by means of compressed air. The temperature under such conditions is as high as 1,300° to 1,400°. The results obtained have been satisfactorily convincing. In thirty-five minutes an entire sheep, weighing fifty kilos and placed in a wooden box, was reduced to ashes, without the slightest smoke or smell. — *N. Y. Commercial Advertiser.*

TRADE SURVEY

Fortunately for both employers and workmen, a truce, practically speaking, has been declared for the season and no general disturbance of the existing friendly relations is to be feared. In some quarters the workmen were inclined to make trouble, but just now the leaders among them are more bent upon making their organization compact than to organize strikes or allow them. It is safe to go farther and say that the leaders are more conservative than they have ever been and for several reasons, one of which and the latest one, viz., that they are coming to recognize that mere strikes do not avail so much after all. Another reason is, that more of the control of labor organizations is passing into American hands, and the foreign element is losing some of its power. The considerable falling-off in membership during the last year or two has been due in a measure to the disposition of American workmen not to be under foreign control. Those familiar with the internal commotions in many of our national labor organizations know this to be the cause of much of the numerical weakness occasioned of late. Employers as a rule have less apprehension from the control of Americans than foreign-born workmen in some labor organizations. Even now there is a wide divergence of opinion as to the wisdom of a general eight-hour movement next year. Lines are being drawn, the foreign element in most places leading in the agitation for a reduction and the Americans following. In Great Britain the movement has much greater force, and promises to be the pivotal question which will decide the election of a score of members of Parliament at the next election. While trades unionism has grown rapidly on this side within two or three years, it has not the same territory to work in or the same problems to solve as the workmen of Great Britain. Eight-hour laws have been enacted in several States and they remain a dead letter. That a more or less general movement will be inaugurated by labor next year cannot be doubted but if the present inharmony of opinion continues as is probable it will, to a very great extent at least, the movement will do no more than to postpone work in some directions and stagnate business in others. The error about to be made is in not consulting employers. Already large employers are endeavoring to hedge against it. Some weeks ago 4,000 men were reduced to eight hours in a great railroad shop. This week the employer of 1,500 mechanics reduced all to eight hours in order to continue all in employment. This course will be prudently resorted to by all who can conveniently do so and long enough before the date fixed for the inception of the movement that there will be no observed connection between the policy and the movement. The fact is the old labor leaders have suffered so frequently from defeat when they were assured of victory, that they are cautious about leading new movements. Conservatism is apparent in speeches, acts, and management.

The improving industrial conditions in Great Britain and on the Continent will check the immigration movement from this out, and decrease the surplus labor in American cities and towns. To that extent it will favor the movement for a reduction of hours of labor, but facts and conditions like these seldom enter into labor counsels or decisions. The trade conditions are neither better nor worse. Last week the Eastern nail-makers submitted a proposition to manufacturers to make twenty-five per cent less, and this week a favorable vote was made on it. The merchant steel-makers have failed to renew their combination, but, as a rule, the twenty or thirty small associations in the iron trade are holding together, restricting production, and waiting for the good time coming, when there will be two buyers for the same product. The wood-working machinery-makers have not effected a general combination, owing to the unwillingness of some of the smaller and widely-scattered concerns to come in. Architects in Western cities have started since the first of the month on a great deal of new work for public buildings, and a number of city architects have emigrated into small Western towns, where their practical services are in demand. The demand for nearly all kinds of materials is now very active; bricks, particularly, are wanted fully as fast as they can be delivered in all markets. Lumber is increasing in activity in all markets. Poplar remains under the control of Southern manufacturers. Yellow pine is strong and active, and large deliveries are being made. The short-log crop is helping prices. Hemlock holds its own, and spruce, for the reason above given, will not be shaded as much as usual. The money market is easy, even with a drop in the surplus reserves to about one million dollars — above the legal limit — a few days ago. A temporary exportation of gold to offset diminished imports was predicted in some financial quarters on Tuesday. The Treasury-bond policy will be continued, at some cost to the Government, but there is a compensating benefit in easier monetary conditions. The volume of business, taking the country all through, is increasing. Prices keep low, and this is advantageous to the masses, although occasioning much unfair complaint among manufacturers and exchangers of values. The increasing interest given to the creation, or rather extension, of an export trade is encouraging, but nothing but radical measures and persistent and well-directed effort will enable Americans to wrest even a small share of the world's trade from the nations who now practically control it. If purely business, instead of political, considerations could prevail in State councils, the battle would be half fought. As we reach nearer and nearer the completion of our general internal development, we will devote more and more attention to securing our share of the commerce of the world. American machinery and special products have found their way into more markets of the world than is popularly supposed, and our commercial competitors, who know our capabilities even better than we do ourselves, are making strenuous efforts through statecraft and through commercial enterprise to head us off as far as possible.

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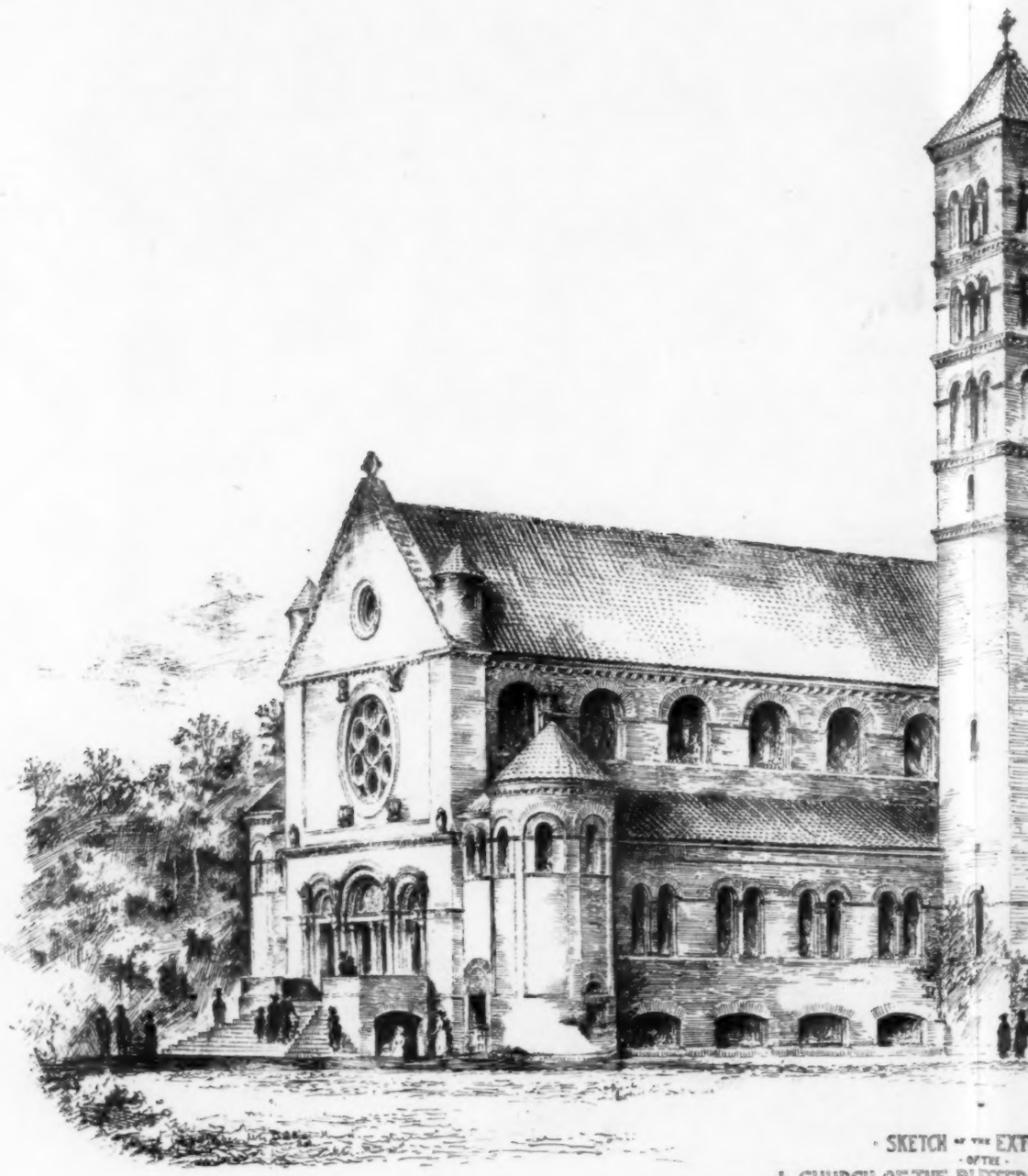

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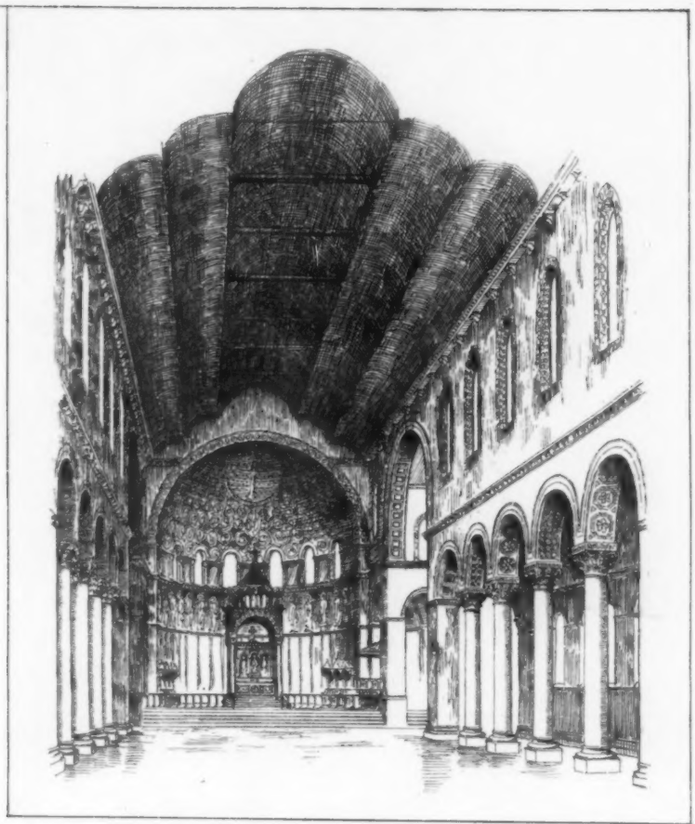

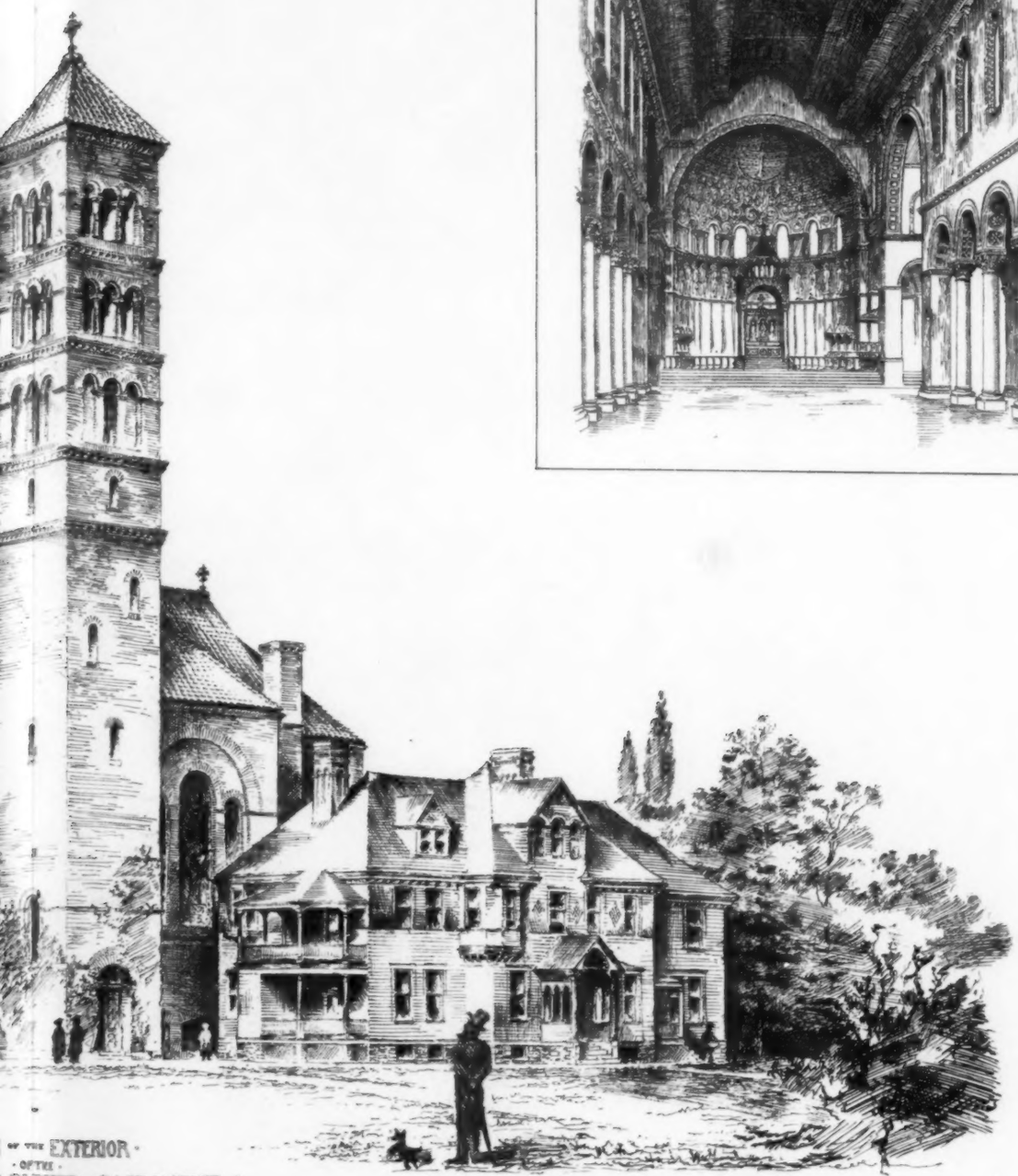

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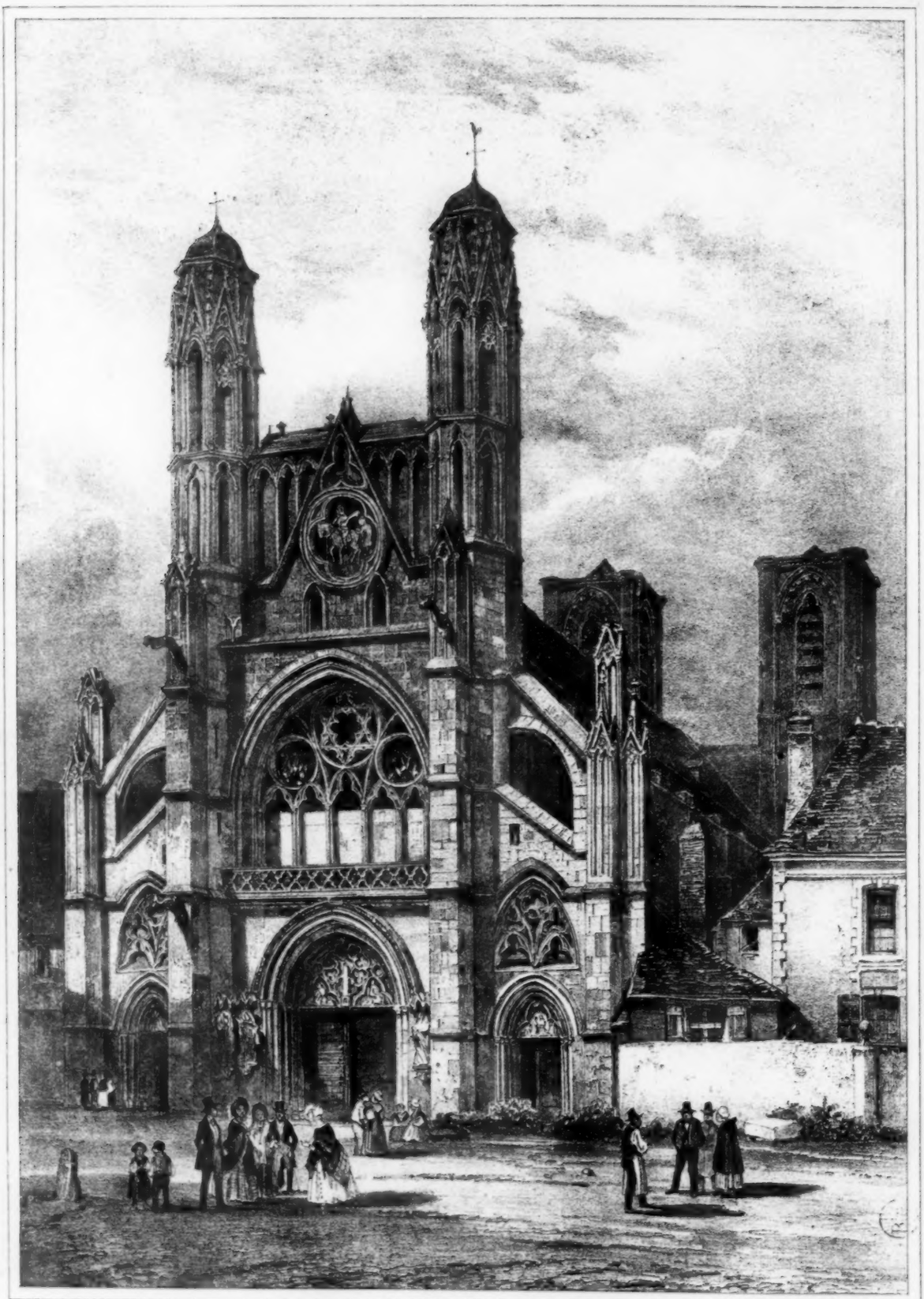

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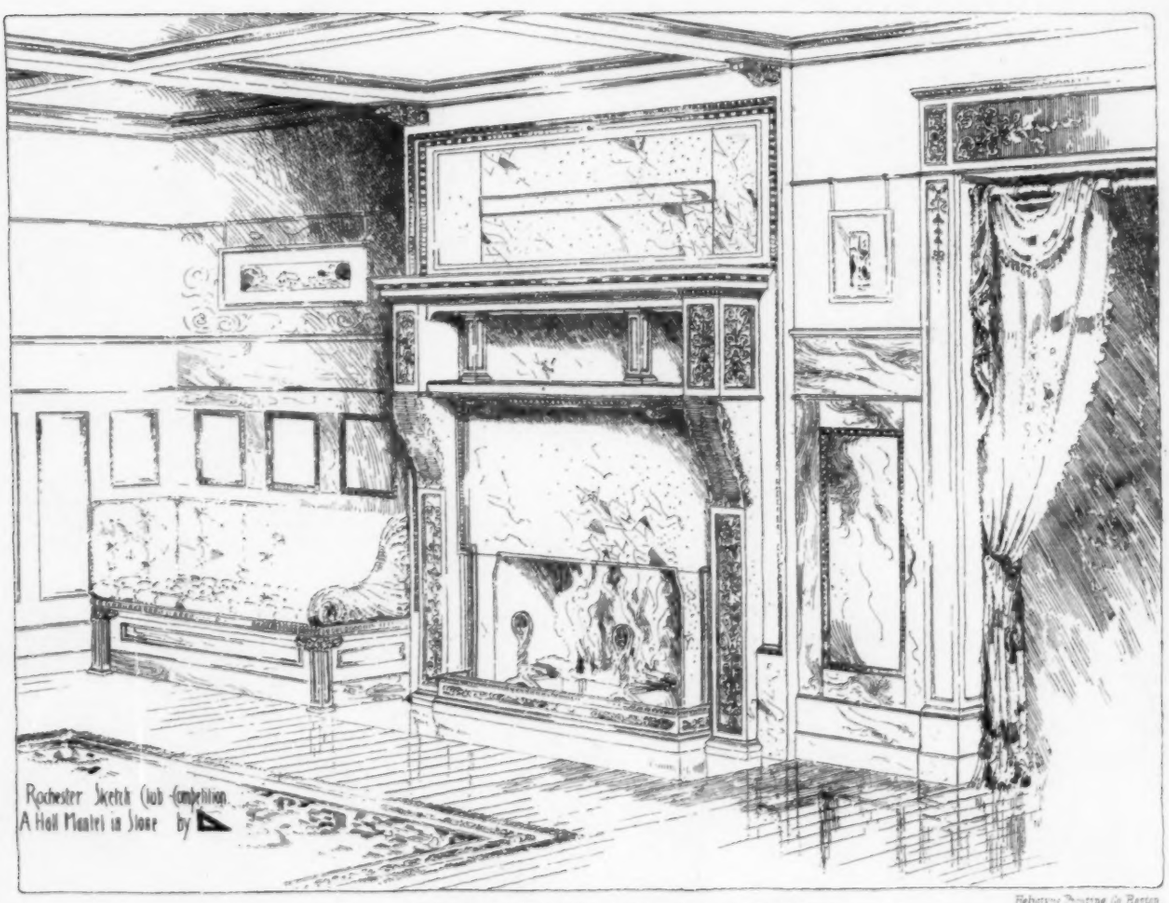

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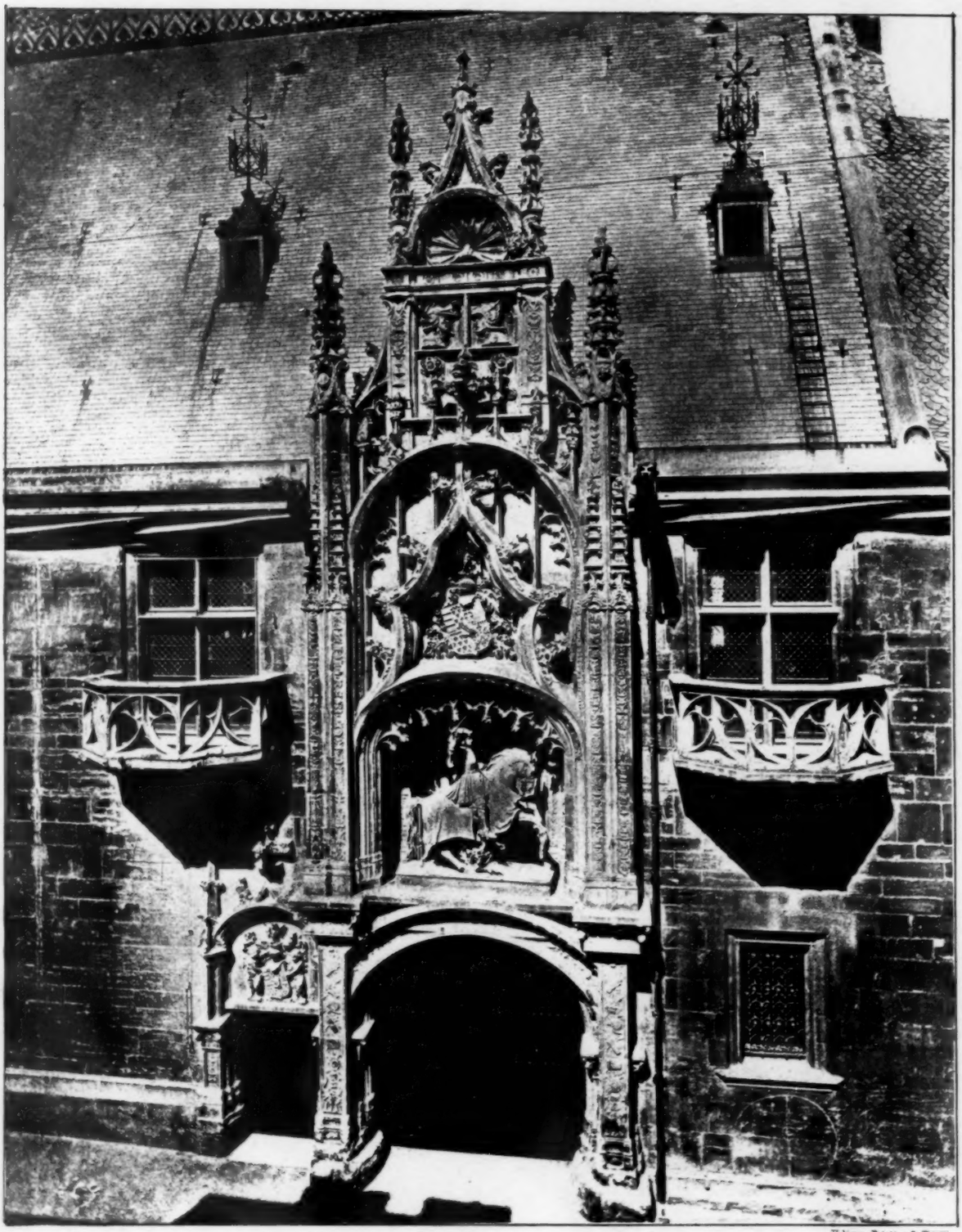

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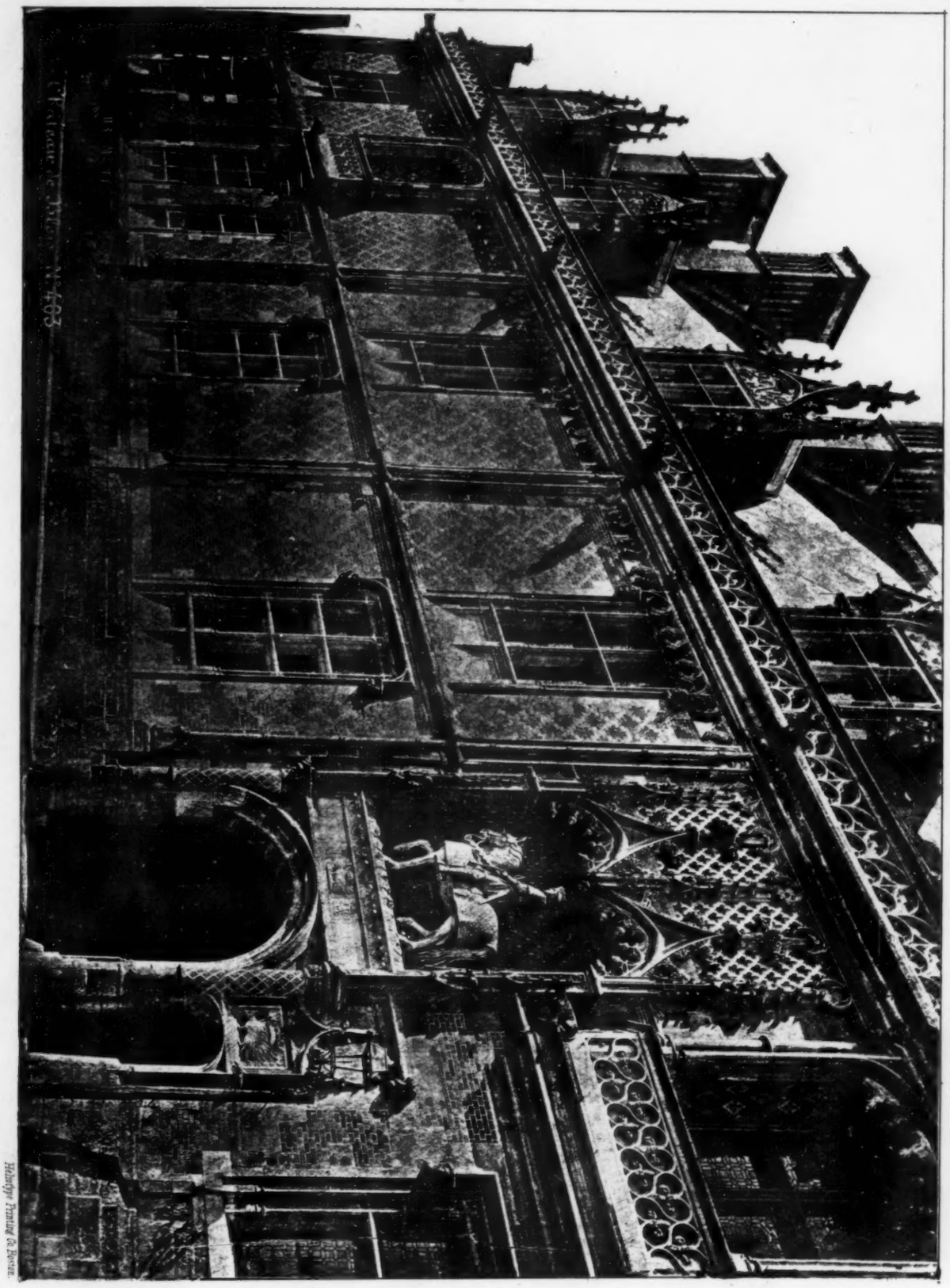

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